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Electric Railway Journal

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Last Call for St. Louis Midyear

THE St. Louis Midyear Meeting of the American Electric Railway Association on March 4 bids fair to be an exceptionally worth-while gathering. If one can judge by the work and planning of the St. Louis committeemen in preparation for the event, it is going to be one of the best the association has held.

A large attendance is also in prospect, judging by the unusually large number of advance reservations for hotel rooms and dinner places. One reason for this is that the program offers real compensation for the trip to the convention city. Traffic congestion, one of the most serious problems confronting the railway operating man, is to be given consideration throughout the whole morning session. The afternoon session will be devoted to another matter in which the electric railways have a keen interest—finance. The speakers at these sessions and for the evening banquet are men whose messages will undoubtedly give us food for further reflection.

Altogether, this last call to the meeting should induce you now to make your reservations—hotel, dinner, railroad—taking advantage of the reduced rate of fare available by use of certificates distributed by Secretary J. W. Welsh, 8 West Fortieth Street, New York City.

Physical Property Shows Progress in St. Louis

THAT much progress has been made in the rehabilitation of the property of the United Railways of St. Louis is indicated by the several articles which have appeared in this paper describing new work of the company. In this issue are articles describing new cars, track, and provisions for economical power supply. An article was published last week on the new automatic substations. An article published Sept. 1, 1923, told how substantial saving was being made in energy consumption through the installation of power-saving devices, and another article, on the new carhouse and storage yard at Broadway and Taylor Avenues, was published in the issue of April 14, 1923. The substance of these articles shows that, apart from the work done by the receiver in readjusting the finances of the company, a great deal has been accomplished along the line of placing the physical property in such shape that it can function efficiently and give real service to the public. These articles are also mentioned here to suggest to delegates to the Midyear Meeting on March 4 the things which they will find especially worth looking up while in St. Louis.

A receivership usually is regarded as a very serious undertaking that may spell the ruin of a road. While this may be true in some instances, where the property has inherent possibilities there may actually be an advantage. The receivers are unhampered by the ordinary obligations to capital, so that money that would go for interest and dividends can be applied to deferred maintenance and construction that for the good of the property should have been taken care of in the past. A wisely administered receivership, then, may be of advantage in making the property good enough that it may ultimately become a real asset to the security holders instead of the liability it must have been at the time of failure.

It has not been a simple task for the receiver, but the physical property speaks for itself, and it is understood the financial difficulties are on the road to a settlement.

It will be interesting to note the further steps in the reorganization of the St. Louis property, and see what the advantage is in having a receiver who has the courage to spend money in order to put the property in condition to save money and operate profitably in the future.

Exhibits, a Barometer of Business

THE American Electric Railway Association will decide at the Midyear Meeting at St. Louis the question of whether there shall be exhibits and the time and place of the next annual convention. A few of the leading manufacturers have been canvassed for their views on this subject, and the majority favor having the exhibits as usual, and at Atlantic City.

No one doubts that an exhibit is about the most economical method for the manufacturer to present his latest developments in equipment to a large number of railway operators. Furthermore, an exhibit is a very effective kind of sales activity. For the electric railway operator, it provides an impetus to keep abreast of the times.

Exhibits in this and all other industries have not been held in years of business depression, but not to hold the annual exhibit in a year of good business is to admit the industry is standing still. The improved financial condition of electric railways negatives such a suggestion. The record of actual sales of manufacturers in 1923 shows an exceptionally good year. The association's exhibit last year exceeded all previous records with a registration of 4,400 and exhibit space of more than 76,000 sq.ft. sold—15,000 more than at any previous exhibition. When no exhibit was held in 1921, the attendance fell to 1,500.

This year the electric light, power and gas industries and the car builders for the steam railroads will hold their usual exhibits.

The electric railways have a quarter of a billion dollars to spend for improvements during 1924. Surely the manufacturers can ill afford to omit the exhibit.

Can any one imagine the motor vehicle industry giving up the national automobile show?

Never was there greater encouragement or opportunity for equipment development work, for the rail-

ways are earnestly seeking means of providing better transportation. Hence the progressive manufacturer will be working this year strenuously on new ideas and will need the exhibit to give first showing to his new products, as well as to display his older products—which are always new to many of the delegates who have seen the thing advertised but have not seen it first hand.

Furthermore, while a convention at Atlantic City lends itself exceptionally well to an exhibit, it is desirable now and then to hold the annual meeting at some other city, perhaps where facilities are too limited to undertake an exhibit. This may be the case in 1925.

Increasing Substation Capacity by Changing Units Has Advantages

A FEATURE of more than passing interest incorporated in the design of the St. Louis automatic substations described in the Feb. 16 issue of this paper is the arrangement for increasing the capacity of a station, not by the insertion of additional machines, but by the substitution of a larger unit in place of the one installed. The former method, which is the customary one, carries with it the necessity for anticipating, perhaps long in advance, the growth of traffic and consequent increase of load. This calls for a more expensive building, and possibly extra real estate. Although the space is provided for in the design, still there is a very considerable expense when it becomes necessary to install an additional unit, as the switchboard and all other auxiliaries must be changed accordingly.

With the St. Louis plan an increase in station load requires that the converter and its transformers must be removed and new equipment of increased rating substituted. Since modern machinery is practically always handled by means of remote control, the larger current does not necessarily demand a new switchboard, but only the substitution of necessary switches of correct rating. Such changes should be easier to make, and be less expensive, than the anticipation and installation of an additional unit.

Apart from the saving in idle investment prior to the increase in station capacity, there is the advantage that a new unit can be installed in place of a smaller one whenever the load exceeds but slightly the rating of one machine. This permits the use of machinery of such size that it approximates the daily loads much more closely than when the rating must be doubled at one operation. Of course, it is entirely possible to have units of different sizes in a manual station to approximate the demand. However, the most recent automatic substations with more than a single unit have duplicate converters so that they may be started interchangeably, thus increasing the reliability of the automatic control.

As a matter of fact, improvements in design have made it possible in the past for machines of double rating, or even larger, to be installed on the same foundations as the original machines. If the same progress can be anticipated in the future, there should be plenty of margin for growth in the system without the installation of additional units.

The major objection to the plan is that machinery must be removed from the station when its rating is increased. On a small property this would be a serious defect, but on a system as large as the United Railways, there will practically always be an opportunity to locate and use the smaller unit to advantage.

New Orleans Does the Wise Thing

NEW ORLEANS has again acted wisely. For a time, however, it appeared that much of the good work done more than a year ago in reaching a settlement of the utility problem there would be negatived by the refusal of certain members of the Commission Council to align themselves on the side of progress for the city. The story of the negotiations looking toward supplying the capital requirements of the New Orleans Public Service, Inc., as the local utility is known, has been told in the news pages as it unfolded itself.

First there was a dispute between the company and the city over the question of whether the average rate base for the year should be $52,924,928 as claimed by the company or $52,144,463 as claimed by the city. Thus there was a difference of $779,864. There was room for honest difference of opinion in regard to the disposition of most of the items, but in the aggregate these items were not important enough to affect rates except ever so slightly even if all of them were allowed to the company.

This question, however, paled before the more important one of providing the funds necessary for extensions and improvements. The return permitted to the company on the rate base is 7½ per cent. Bonds of the company secured by mortgage have been selling at rates which still reflect the uncertainties of the past, one issue to net more than 8 per cent and another more than 9 per cent. Financing by means of bonds, accordingly, was out of the question.

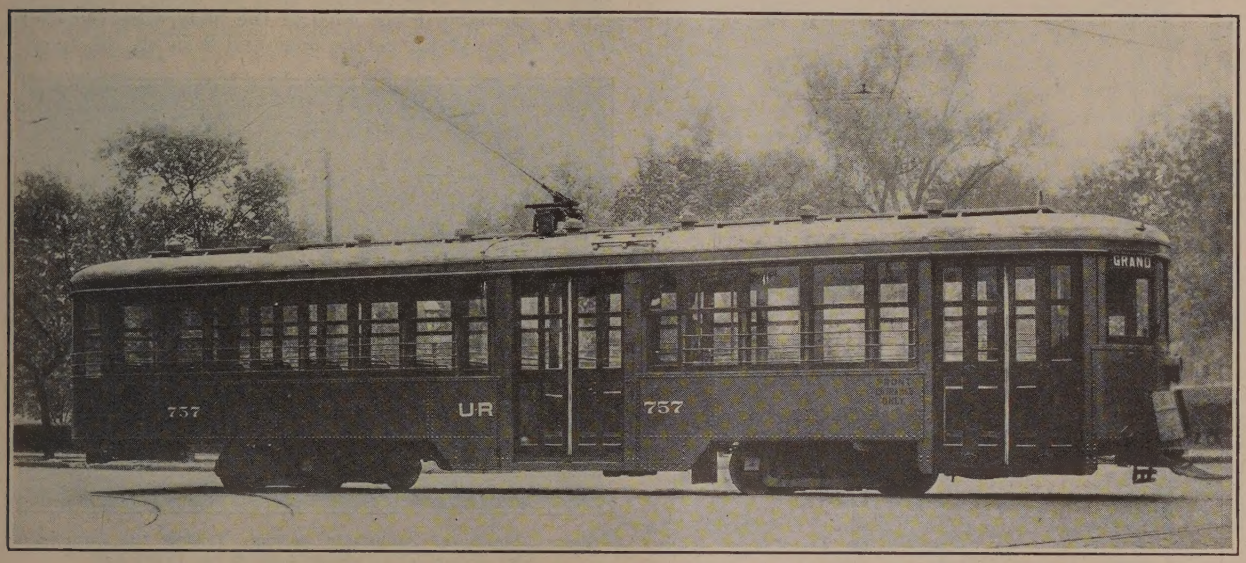
But the need of New Orleans was immediate. The Electric Bond & Share Company, owning the common stock, stood ready to purchase $7,500,000 of additional common stock at par to pay a 9 per cent return if earned. This, of course, looked big to some of the representatives of the city. After all, however, the return fixed for the whole property on the rate base is 7½ per cent, so that in the light of the risk taken by the holder of the common stock the rate of dividend was not incommensurate.

The financial set-up at New Orleans following the reorganization was $42,000,000 of bonds and only $12,000,000 of preferred and common stock. As a matter of fact, on the average rate base of $52,939,371 for the year ended Sept. 30, 1923, the company earned a balance of only $1,325,896 available for sinking fund requirements, dividends and surplus reserves, or 6.61 per cent on the rate base. Thus the Electric Bond & Share stood ready to stake millions of dollars on the prospects of the future. Yet it took a long while to win the members of the Commission Council over. But now that it has been done, the prospects are that affairs affecting the utilities in New Orleans will proceed along lines that will quickly result in all the advantages that follow when a public utility is so strengthened in its financial position that it can function financially and physically to the best advantage.

SOME most interesting papers and discussion on means to relieve traffic congestion and speed up local transportation were heard at Chicago before the Western Society of Engineers on Feb. 6 and 7. They are published in this issue and that of Feb. 9. They will be of special interest to electric railway men just now in view of the session to be devoted to the same subject at the St. Louis Midyear Meeting of the A.E.R.A.

St. Louis Front-Entrance, Side-Exit Cars

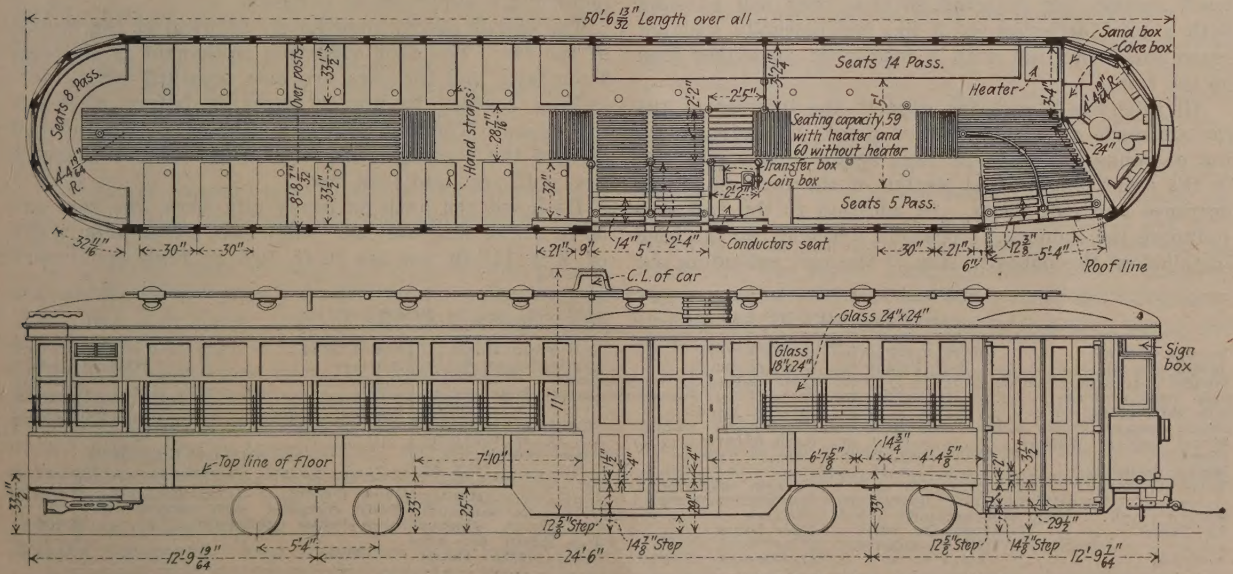
Fifty Cars Now Building Will Make Total of 201 of This Type Which Have Been Placed in Service Since 1920—Standard Design Retained Is Featured by Ramps in Floor, Inside Steps, Separate Motorman's Compartment and Aluminum Rails and Stanchions



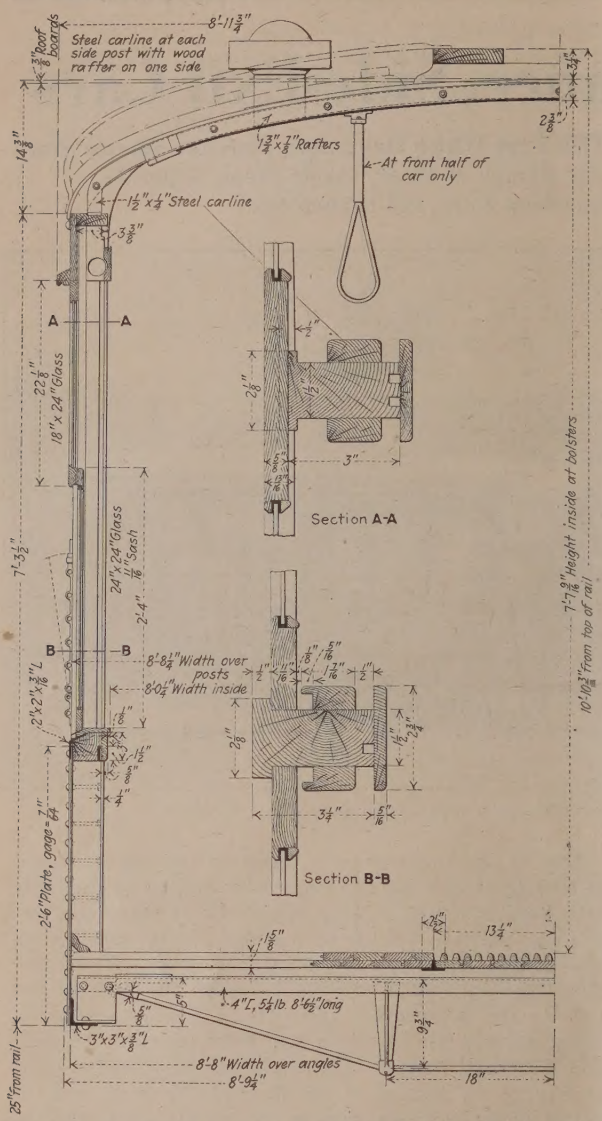
Fifty Motor Cars of This Type Are in Process of Construction for Use on United Railways of St. Louis

A GROUP of fifty front-entrance, side-exit motor cars now being constructed in the shop of the United Railways of St. Louis, under the direction of M. O'Brien, master mechanic, will give this property a total of 201 cars of this type in service when the present lot is completed. The design has been maintained standard for each group, and the new lot is therefore almost an exact duplicate of the first group, which was described briefly in ELECTRIC RAILWAY JOURNAL, Sept. 18, 1920, page 551. One important change has been made from the first lot of these cars, in that the more recent cars have been equipped with four 35-hp. motors whereas the first group had four 25-hp. motors.

One of the features of interest is the use of ramps at both the front end and the center section to eliminate drop platforms and folding steps, and at the same time to make possible the use of a single 12⅝-in. inside step, both at the center and at the front doorway. To accomplish this with 26-in. diameter wheels the floor of the car is carried as low as possible, a clearance of 3 in. being allowed for the light car body between the floor and the wheel flange. Additional clearance is obtained by having the bottom of the floor at the front end cut out in an arc corresponding to the wheel swing, so as to prevent the wheels from rubbing against the under side of the floor when the truck parts become worn. The



Low Step Heights Are Obtained by the Method of Ramping the Floor Arrangement of Floor Strips in Aisle Is Shown in Plan

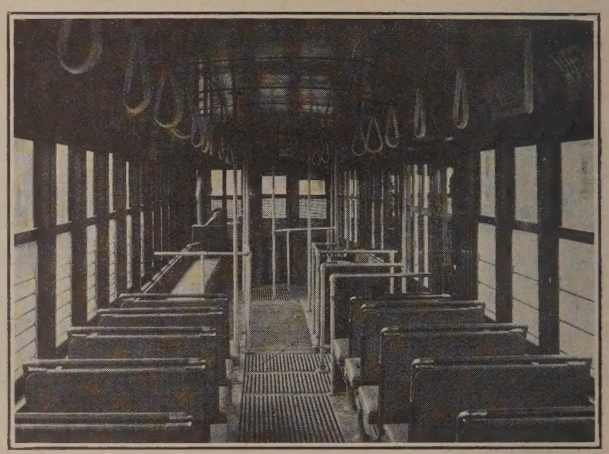


Steel Side Girder Framing and Wood Side Posts Are Used. Cross Sill Channels Are Installed with Web Horizontal to Give Additional Clearance

truck springs are designed so that they will go solid with a total deflection of 3 in., but normally will not reach this deflection with a maximum passenger load on the car.

All rails and stanchions used in the interior of the car are made of 1-in. aluminum pipe. To assist standing passengers, stanchions have been liberally provided in the front longitudinal section of the car and at the entrance and exit doors. In addition to the rail surrounding the conductor's position, a second rail has been installed on the opposite side of the car, extending out from the longitudinal seat, so as to produce in effect a narrow aisle immediately opposite the conductor. This is to facilitate the collection of fares when the car is crowded. The arrangement of these rails and stanchions is clearly illustrated in an accompanying photograph.

A step height of 14⅞ in. from the rail to the inside step is obtained, with an additional rise of 12⅝ in. from this step to the car floor. The heights are the same at both the front and center door openings. From the edge of the step to the edge of the body aisle the floor ramps 1½ in. at the center door and 2 in. at the front.



Floor Ramps and Aluminum Railings Feature the Interior. Note Motorman's Compartment at the Front End

The top of the floor at the bolster is 33 in. above the rail. To reach this point, a longitudinal ramp of 4 in. in 6 ft. 7⅝ in. is provided from the center, and a similar ramp of 3½ in. in 4 ft. 4⅝ in. is put in at the front. The aisle is arranged with floor strips extending across the direction of movement, to prevent passengers from slipping. In addition the edges of the floor and steps are protected by Feralun step treads.

The cars are arranged for single-end operation. The motorman is provided with a compartment built into the front end of the body. In addition to the control apparatus, this compartment contains boxes for sand and coke. A Peter Smith hot air heater is located in the front corner of the car body, immediately back of the motorman's compartment partition.

The exit is placed immediately forward of the middle of the car. The door operating equipment is National Pneumatic and the cars are also provided with interlocking control, to prevent starting before all doors are closed. The conductor's station is at the forward side of the opening. He is provided with a transfer box, coin tray and fare box.

Designed for duty on heavy city lines, the cars are 50 ft. 6 13/32 in. long over all. They have a maximum width of 8 ft. 11¾ in. and are 10 ft. 10 3/16 in. high over trolley

GENERAL SPECIFICATIONS OF NEW ST. LOUIS MOTOR CARS

Length over all	50 ft. 6 13/32 in.
Width over all	8 ft. 11 3/4 in.
Height over trolley boards	10 ft. 10 3/16 in.
Side post centers	30 in.
Side sash glass	24 in. x 24 in.
Truck centers	24 ft. 6 in.
Wheel base of trucks	5 ft. 4 in.
Gage	4 ft. 10 in.
Wheel diameter	26 in.
Type of truck	Commonwealth cast steel frame, built by railway
Motors	Four Westinghouse 510-A
Air brake	Westinghouse SM-3 with DH-16 compressor
Journals	3-3/4 in. x 7 in.
Control	K-35 G. R. 2
Line switch	Westinghouse 801-E
Door operating mechanism	National Pneumatic safety interlocking
Interior trim	Cherry
Headlining	Agasote
Sash fixtures	O. M. Edwards
Curtain fixtures	Curtain Supply Co. ring 88
Curtain material	Pantasote
Destination signs	Hunter
Buzzers	Consolidated
Fare boxes	Johnson
Heaters	Peter Smith hot air
Headlights	Ohio Brass
Step treads	Feralun
Sanders	Nichols-Lintern
Registers	Security
Hand brakes	Peacock
Trolley catchers	Ohio Brass
Trolley base	Ohio Brass Form No. 1

SUMMARY OF WEIGHTS

Two trucks complete less motors	10,414 lb.
Four motors	5,900 lb.
Body complete with control and air brake equipment	23,086 lb.
Total	39,400 lb.

boards. Longitudinal seats are used in the front section and cross seats in the rear. The operation is on the pay-as-you-pass principle. The total seating capacity is fifty-nine passengers in winter and sixty in summer, when the heater is removed. Cross seats are spaced on 30-in. centers, which corresponds with the spacing of the side posts. The design gives an interior width of 8 ft. 1⅛ in. over the side post pilasters. Using a 33½-in. cross seat cushion, an aisle width of 28 7/16 in. is obtained.

Straight side girder construction with wood side posts is used. The girder sheets are 6/64-in. material reinforced with 3-in. x 3-in. x ⅜-in. lower side-sill angles and 2-in. x 2-in. x 5/16-in. angles at the belt rails. The horizontal flange of the latter is bent up at an angle of 24 deg. so as to provide for drainage.

Ash side posts of 3¼-in. x 1½-in. section are fastened to the side girders by through bolts. The lower sash are of wood and are arranged to raise, while the upper sash, also of wood, are framed in continuous lengths and fastened permanently to the outside of the side posts. Tenoned across the tops of the side posts are wood top plates, and 1⅜-in. x 7¼-in. wood letter boards complete the side frame construction.

Flat steel carlins of ¼-in. x ¾-in. material are bolted to 1¾-in. x ⅞-in. ash carlins and are set on the top plate at each side post, to form the arch roof framing. The roof is covered with ⅜-in. tongued and grooved poplar.

To obtain maximum clearance under the floor for brake rigging and other apparatus, the body cross sills, which are made of 4-in., 5¼-lb. channel, are set on the flat instead of on edge. Round steel truss-rods on these cross sills are made of ½-in. material and are supported on malleable iron struts, 9¾ in. long. The floor is of double thickness, 1⅜-in. material. Yellow pine is used for the under floor and on the sides, but in the aisle the top layer is replaced by maple strips.

How Shall We Solve Traffic Problems?

How This Work Is Being Organized in Some Cities and Some of the Results—Why a Broader Viewpoint Is Necessary—The Traffic and Transportation Plan Should Be Made for a City Double the Present Size—Greatest Need Is Leadership, and Railways Should Supply It

By J. Rowland Bibbins
Consulting Engineer, Washington, D. C.

IN A PREVIOUS article in the ELECTRIC RAILWAY JOURNAL for Nov. 10, 1923, some elements of the traffic problem, with which every large city and traction company is confronted, were analyzed and discussed as to the broader features. Now it seems desirable to inquire whether this vastly important matter is being handled adequately, what results are being secured, also to consider whether more effective and far-sighted methods and organization are not needed.

Traffic and transportation have assumed a new significance and importance within the last decade, for they now involve things outside the operation of the railway. In fact, the operating integrity of every large railway system is coming to be not a matter of how to run street cars better, but how to run them at all. The study of traffic today is not simply one of parking signs and police regulation, as most people think, but is one which should cover the following main elements:

1. Street and highway plan, for present and future.
2. Transit service—capacity and routing.
3. Traffic organization and control, vehicle and pedestrian.
4. Railroad terminal operations; marine, in port cities.
5. Relation to the broad city plan and general public welfare.

To illustrate, most railway men conceive the private automobile as the principal offender in traffic congestion. But in a recent traffic survey the writer found that commercial vehicle traffic averaged about one-half of the total automotive traffic in the downtown district of a large city and held practically constant throughout non-rush hours—a condition which is clearly brought about in this city by the extremely defective thoroughfare plan. Railroads have continued to concentrate their local traffic close into the business district, which results in cluttering up the streets with crosstown freight movement. Few industries have taken steps toward efficient cartage control with definite routing for their trucks and delivery vehicles, such as that established some years ago by the Denver Tramway Company, in connection with its construction work. In port cities marine trucking traffic to industries and freight stations may also be found using passenger streets quite unnecessarily. Another source of congestion is that many commercial houses use the sidewalk and street for loading and are thus quite inconsiderate of the need for full street capacity.

EXAMPLES OF HOW PROBLEM IS BEING ATTACKED

How is the problem being studied? Three cases will illustrate.

1. In Baltimore, a traffic committee appointed by the Mayor has just reported after six months labor.* The report covers numerous detailed recommendations mostly pertaining to the central district. It gives little or no consideration of the proper relation of the central district to the entire city and the further development of local transportation to meet future needs. But it does lay great stress upon railroad grade separation throughout the city, citing seventy-seven locations for examination. All existing traffic regulations are proposed to be abolished and the entire matter put into the hands of the police commissioner without technical supervision or advice of any kind. And the far greater problem of an adequate transportation plan seems not to be comprehended in the report.

2. In Washington, the United States Senate committee of the District of Columbia, after long hearings, has finally reported to Congress. This report goes much further. While urgent recommendations are largely confined to disciplinary measures to secure quick relief, the report does recommend "a thoroughgoing engineer-

*This report was reviewed in ELECTRIC RAILWAY JOURNAL, Feb. 9, 1924, page 232.

ing survey" of local transportation and development covering:

Determination of conditions and facts from detailed traffic surveys.

Relative value of present streets and facilities.

Future trends and needs of Washington.

Means of simplifying street car routing and operation, and increasing loading speed.

Approximate cost of improvements and means of financing.

3. Indianapolis has perhaps visualized this program most concretely under the auspices of the City Plan Commission. Zoning is an accomplished fact in this city. The commission next turns to the transportation plan, broadly conceived, the first step of which is the development of a city-wide, comprehensive traffic thoroughfare system. These thoroughfares are being classified and designed for auto speedways, boulevards, local and rapid transit streets and heavy traffic streets, with particular reference to the by-passing of traffic foreign to the central business district.

The next step will be to develop traffic organization and control involving the usual multitude of details, particularly to afford relief to the central district.

The third step will seek improved rail routing and operation, particularly in the congested district, but also as it affects the entire transit system. This involves to some extent both previous steps, with these objects:

To untangle downtown traffic and railway looping by decreasing both car and vehicle interference so as to release traffic capacity.

To increase speed of transit through, and loading speed within, the terminal district.

To increase the facility of through movement and decrease necessity of transferring as far as possible.

To secure a better passenger distribution and pick-up throughout the business district.

To provide traffic capacity for inevitable future growth of the transit system, at the same time making a provision for the adoption of the motor-bus when and where practicable.

The fourth step involves railroad terminals, line and grade separations, as all these factors involve city development, continuity of main thoroughfares and the relief of traffic and transit obstructions, now so serious. The sequence of these railroad developments is particularly important, and the location of new lines so as best to round out the city in residential settlement.

Other investigations are continually being reported by automobile clubs, electric railways, chambers of commerce, newspapers, civic clubs and the interminable sporadic efforts of local improvement associations. Most of these efforts are voluntary or directed toward the protection of definite interests.

Only in Boston, with its forty-two surrounding communities, has a well-conceived transportation plan been put under way. This is adequate in scope but unfortunately hampered by limited working funds. Chicago, Pittsburgh, St. Louis and Los Angeles have approached the problem in parts at different times.

What the situation needs is leadership. And the railway industry, with its personnel most skilled of any of these groups in the art of transportation, seems best qualified to and should take and hold leadership with courage and perseverance. It should assume a positive rather than a negative attitude; i.e., what to do rather than what not to do. To put the programme concretely:

1. Organize co-operatively adequate technical and factual surveys of local conditions, traffic movement, and the needs of present relief and future development whether by rail, bus, rapid transit or steam suburban service. The financial support for such work should not be niggardly, but commensurate to its vital importance to the industry.

2. Develop a comprehensive traffic and transportation plan based upon this factual survey which shall furnish the authorities and people with a guide to reasonable future action and development. Minor details of traffic control are entirely subordinate in first importance.

3. Organize a competent local civilian advisory body to consider this plan, subject it to constructive criticism and to furnish the powerful support which such a body can give. This is its proper function.

4. Spread broadcast by every educational means properly available the theory, purpose and advantages of the transportation plan so that the authorities may be better qualified in their official actions to express more directly the enlightened opinion of the community.

5. Start now to carry out the plan as fast as conditions warrant.

Some detailed problems have received practically no study. Yet they are of the greatest importance. Many of these so-called traffic problems are subject to the same analysis as street railway and railroad operation. For example:

Efficiency of the police traffic signals and effect on track capacity, headway and routing.

Proper relation of signal duration to traffic volume. Best type of signal for varying traffic conditions—fixed, flexible, block signal.

Best means of segregating traffic, horizontally and vertically.

Adequate relief of congested district from foreign traffic.

Three-track express idea in traffic routing.

Determination of the average parking time demand for different classes of traffic and facilities needed for each.

Economic design of traffic roadways for their particular service.

Here are essentials for the future toward which every large railway system should be working:

Increase of 10 to 20 per cent in car schedule speed—imperative to meet private automobile competition.

Doubling the efficiency of use of roadways by traffic. It can be done now in many cases.

Large increase in efficiency of police signal control. This is the critical or key point of attack.

Development of cheap day storage by efficient alley-garages; municipal undertaking if necessary

Development of limited-stop express service by car or bus to major outlying sub-centers whenever feasible.

Cartage control of commercial vehicles by business or industry operating them, especially routing.

Higher efficiency and control of off-track railroad freight movement, especially higher unit loads and routing.

Standardization of large vehicles to economize in the great cost of providing adequate roadways.

Development of the arcade plan of street widening, where full widening is not feasible.

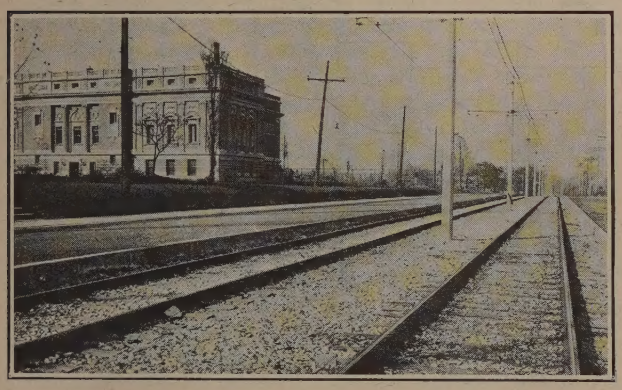
More high-class railroading in traffic organization, movement and control.

Every city should be at work on its traffic and transportation plan. The more one studies these complex traffic operations, the more it becomes evident that one-sided or part solutions will be totally inadequate to secure lasting results even if temporary relief is secured. The scheme of organization proposed therein is simply in line with the modern tendency toward research. It embodies co-operative effort so essential in the final stage of the proceedings. We should plan now for a city of double the present size without stopping to quarrel at just what time this growth probably will be reached.

St. Louis Track Construction Includes Novel Features

Open Construction with T-Rail on Rock Ballast Is Used on Reservation or Private Right-of-Way in City Streets — Granite Flange Blocks Are Used with T-Rail in Paved Streets — Special Machinery Facilitates Construction Work

OF THE 518 miles of track of the United Railways of St. Louis, serving a population of 900,000 in the city of St. Louis and 100,000 in University City and St. Louis County, 144 miles are of the open T-rail ballasted type of construction. Approximately 17 miles of this track are located within the city and in incorporated suburban towns and are laid in reserved strips in the center or alongside of public streets. Adjoining large parks and cemeteries, these reserved strips are placed alongside of the paved roadway, while in other locations they are placed in the center of the street. This arrangement facilitates the movement of traffic by keeping the automobiles, etc., clear of the tracks. The crossings over the right-of-way are placed at such intervals that the cars are permitted to operate at comparatively high speeds.



Concrete Center Pole Construction Is Used Extensively on Private Right-of-Way in St. Louis

Approximately 17 Miles of Track in City and Suburbs Are Laid in a Reserved Strip

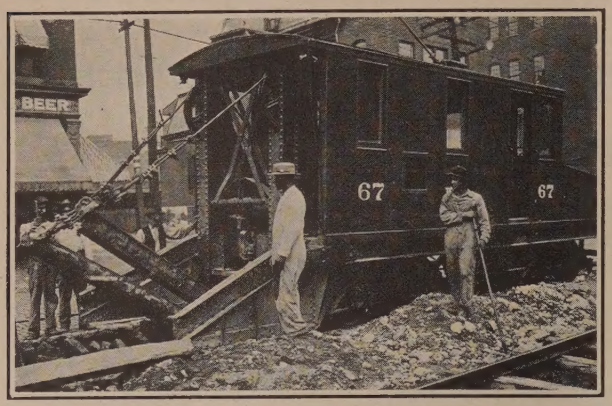
In some cases the city when improving the street has simply provided for pavement outside of the space occupied by the tracks and has permitted the company to occupy the reserved strip without any expressed franchise agreement. In such instances the railway, since it holds no title, is not required to pave the adjacent roadways. In other locations the company holds title to a private right-of-way in the center of a street and ownership obligates it to pay certain portions of the cost of paving the vehicular roadways. Such expense, however, is always considerably less than the cost of paving the space in which the tracks are located, so that the arrangement results in considerable economy.

An extension approximately 2 miles in length which was made some years ago into a comparatively well built up section west of the city furnishes an interesting example of the method used for acquiring a private right-of-way in a new district. The agreement to make the extension stipulated that the tracks were to be located in a 24-ft. private right-of-way between two 23-ft. streets, a total width of 70 ft. An existing street along the route varied in width from 50 ft. to 60 ft. Special deeds were prepared to transfer all property required for the 70-ft. street, and not yet dedicated to public use, to a trust company which held it in trust until the tracks were completed. Prior to the completion of the track, an agreement was entered into with each municipality through which the line ran to vacate the old streets upon the condition that the line was built and the new streets were dedicated. Upon completion of the track the trust company conveyed to the railway company its private right-of-way and then dedicated to public use the two 23-ft. streets on each side. Certain crossings were specified in the franchise ordinance passed by each city.

Since the completion of this line several of the streets on each side of the tracks have been paved and the cost of the pavement of such streets has been considerably less than would have been the cost of paving the tracks had they been laid in a public street. These cities were of the third and fourth class and street pavements are paid for on the front-foot basis. The company, therefore, paid one-half the cost of improvement of roadways in each case.

Wydown Boulevard, in the city of Clayton, furnishes another interesting example of this type of construction. The tracks are located in a 30-ft. right-of-way on each side of which a 45-ft. street is built. A 5-ft. strip on each side of the right-of-way has been left after the subdivision and improved with grass and trees. The streets are well paved and are built up with very high grade residences, on land that sells for more than $100 per foot.

A broad city planning idea has been generally accepted in St. Louis County. As a result the United Railways has received co-operation from the subdividers of lands along its county lines. In some cases the railway company has furnished tentative plans for the subdivision of a large number of tracts and has gone to considerable trouble to assist subdividers in order to



Rail Breaker Facilitates Track Reconstruction. The Wings on the Sides Shear Off Ties and Paving as the Rail Is Pulled Out

demonstrate that such land could be subdivided properly from a sales standpoint and at the same time leave satisfactory lines of communication across the tracks without an excessive number of crossings. After several years of such co-operation with land owners the engineers of the railway are generally consulted about proposed subdivisions and in almost all cases have been able to secure a great improvement in original plans.

Types of Track Construction

Paved track in streets comprises a total of 338 miles and in addition there are 36 miles in carhouses and yards. Of this total 191 miles are laid with new modern rails on concrete foundations and paved with hard pavements, 85 miles are laid with obsolete types of side bearing girder rails on concrete foundations, 19 miles are obsolete types of side bearing girder rails on ballasted foundations and 45 miles are track special work.

The new rails used by the United Railways in paved streets are Lorain, 9-in., 132-lb., section 440; Lorain, 7-in., 103-lb. girder, section 426 or 478; Lorain, 7-in., 95-lb. T, section 400, and Lorain, 7-in., 91-lb. T, section 375. A large percentage of this T-rail replaced obsolete types of 7-in. girder rails which had been laid on concrete foundations. The 9-in. girder rail is used in the downtown district and the 7-in. is mostly in paved streets where there has been a large amount of vehicle traffic.

Six-inch, 100-lb. A.R.A. T-rail, series "A," which is used in 127 miles of track, is the standard type of rail in general use except in the downtown districts or where steel-tired vehicular traffic is heavy.

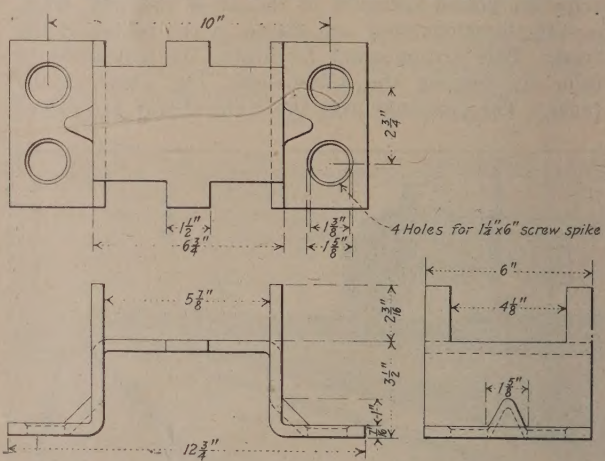
During Reconstruction Work, a Portable Siding for Work Cars Is Used and One Main Track Is Kept in Service

Most of the open track in private right-of-way is laid with 80-lb. T-rails on creosoted oak ties with gravel or broken stone ballast.

Where obsolete types of girder rails laid on concrete foundations are replaced with new rails the 100-lb. T-rail is used, and this rail is laid on a 3-in. forged steel chair manufactured with four lugs which bend down over the base of the rail to hold it in place. Tie rods are used on standard 6-ft. spacing to hold the rails to gage. Ties which are in bad condition in old concrete foundations, through decay or spike killing, are removed and replaced with steel ties of the M-25 Carnegie type. By using the steel tie in such work it has been found easy properly to surround the new tie with concrete.

The standard track foundation is at least 12½ in. thick, 6 in. of the material being under the ties. The concrete consists of a 1-3-6 mix. The ties are 6-in. x 8-in. x 7-ft. 4-in. hewn white oak, adzed and drilled for screw spikes in the material yard before delivery on the work.

On new foundations laid for 100-lb. T-rail tracks the Vaughn type of tie plate is used. This plate is made



Forged Steel Chair Used in St. Louis for Mounting 6-In. T-Rail on Old 9-In. Foundation

of soft steel ⅜ in. x 7 in. x 10½ in., sheared so as to provide four lugs which can be bent down over the rail base. Screw spikes ⅞ in. x 6 in., placed more than 1 in. away from the rail base, hold the plate firmly to the tie. No tie rods are used in such work.

All joints in T-rail tracks are made with rolled, ten-rivet, 32-in. Nichols joint plates, 1-in. rivets being placed with an 80-ton squeezer. Joint plates and rail ends are thoroughly sand blasted before the joints are made and the spaces under the rail head and around the rail base are filled with molten spelter.

Standard new 9-in. girder rail track construction is made up of a solid concrete foundation 15 in. thick with 6 in. of concrete under the ties, using the white oak ties already mentioned. Other details include ½-in. x 6-in. x 11-in. flat tie plates, malleable steel rail clips, ⅞-in. x 6-in. screw spikes, sixteen-rivet, 32-in. forged Nichols joint plates and ⅞-in. round tie rods with standard 6-ft. spacing.

Special Work Is Manganese

Practically all of the special work used by the United Railways is of the solid manganese type. Standard switches have a 100-ft. inside radius and standard frogs are used as far as possible. Comparatively few triple frogs are in use and carhouse layouts are of a simple type, containing very few triple frogs or double

curve frogs. Switches and mates in carhouse special work are almost all open hearth material, with a 40-ft. inside radius. Spring switch locks are used on facing point switches in car yards and on main line tracks, but electric switches are used at the more important locations.

Nichols joint plates have been found to have an electrical efficiency considerably above that of the rail itself, and consequently no bonds are installed at these joints. Cross bonds between rails and between tracks are placed about 180 ft. apart or about every third rail.

Poles supporting trolley wires in streets are almost all placed along the curbs, very few being in the center of the street. Most of the metal poles used during recent years are the tubular steel or the "Bates" type. Reinforced concrete poles, 35 ft. long, have been used extensively on county lines or along private right-of-way. This type has been used for most of the center pole construction in open track.

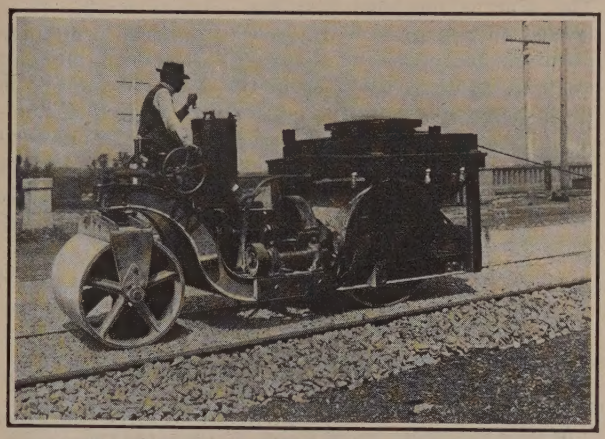
Track pavements during the past two years have been laid with new or redressed granite blocks of Missouri, Wisconsin or Carolina stone, but Missouri granite is being used almost exclusively for flange blocks in T-rail tracks. The street department of the city of St. Louis now insists upon the use of granite in track work, both for repairs, construction and reconstruction work. Paving blocks are generally laid on a sand cushion with a cement-sand grout filler, but in some cases the blocks have been laid on a cement-sand cushion with a cement-sand filler. For paving the 1-ft. space outside of the rails, special blocks 12 in. in length are purchased, and these blocks are laid on a cement-sand base and with a cement-sand filler.

Track Construction Equipment

The material handling equipment of the United Railways consists of twelve tool cars for division track foremen, approximately seventeen motor flat cars, nine motor trucks and seventeen trail flat cars. One Differential dump train, one Koppel dump train and four dump cars of the gondola type, three center dump ballast cars and two special dump trains complete the material handling equipment. The special dump trains consist of two-car units, each car containing eight dump boxes designed by the railway for distributing materials away from the track. The boxes dump over the sides of the cars in such a position that material is thrown almost completely clear of the track cut. The unit box arrangement has been found particularly satisfactory for distributing the proper proportions of sand and stone along the track for making concrete.

A rail breaking machine, two Thew shovels, one Clark pavement plow, air compressors and blasting cars make up the equipment for taking out old tracks. The Thew shovels unload directly into dirt trains which stand on a portable siding connected with a Kerwin crossover. This siding is dragged along the street by the work cars. It is of sufficient length to permit the dirt trains to serve the Thew shovel and at the same time permits the rail breaking machine to tear out the old tracks ahead of the shovels.

Old rail is removed with a rail breaking machine which consists of a two-drum 50-ton Clyde hoist, operating two rope cables each of 1¼ in. diameter. The hoist is mounted in a car supported on a steam locomotive tender frame base. The front end of the machine is loaded down with ballast and at the rear end an "A" frame controlled by air cylinder is mounted so that it can be made to bear on the rails. The heavy rope cables attached to rail tongs are brought down from sheaves on the top of the "A" frame to points on the rail about 7 ft. behind the car. The rail breaker tears up rails, tie rods, pavements and practically all ties in ballasted tracks. In concrete tracks, however, only those ties which are larger at the top than at the bottom are pulled out.



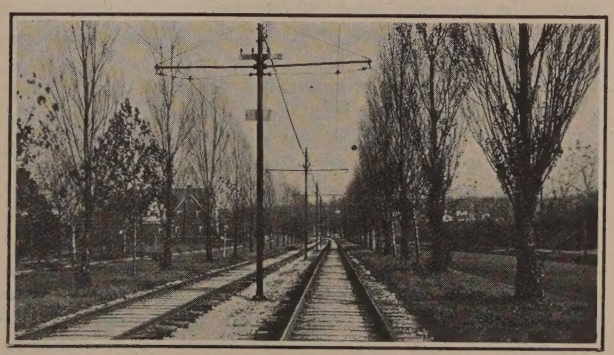
An Electric Pavement Roller, Equipped with Cable Reel

The concrete mixers in use are the Drake type fed by long chain conveyors. It is the experience of the United Railways that careful gaging of the materials placed alongside the tracks for concreting will insure a satisfactory quality, and the cost of handling is much lower than with other types of machines.

A special grout mixing car is used in mixing grout for paving filler. The completed pavements are rolled with a 5-ton roller operated by a 35-hp. railway motor. Power is supplied to the roller through a cable, the slack of which is taken up with a mine reel mounted at one end of the roller. One advantage of electric operation is that a licensed engineer is not required.

Placing of Concrete Materials

Work trains which can be used for hauling materials in bulk are plainly marked as to capacity. Blueprints which will show the capacity of the cars for various heights of crown are furnished all employees who are required to distribute materials. These prints also show the height of sideboards which will give the designated level load capacity for each car and the quantity of materials required for a large number of types of track ditches. By their use, practically all calculations by the receivers on the job are eliminated.



A 5-Ft. Grass Strip on Each Side of Way Was Put in by Arrangement with the Subdividers

The sand is unloaded first for concrete work. It is leveled off and gives a windrow of material ordinarily about six feet wide and about six inches deep. Broken stone is then placed on top of the sand and the pile is made reasonably uniform. After this a specified number of sacks of cement per unit of length are unloaded on top of the broken stone. Spacing rods about eight feet long are marked to indicate the proper distribution of cement, and the laborers are requird to dump one sack for each space indicated by this rod.

Energy Costs Reduced by Auxiliary Steam Plants

Two Steam Power Plants Operated by United Railways of St. Louis Take Peak Loads and Enable Company to Obtain Energy at Favorable Rate

IN ORDER to use hydro-electric power advantageously for railway purposes, the United Railways of St. Louis is operating two steam plants built in 1901 in combination with purchased energy derived from water and steam. The water power is obtained at a very attractive rate, but the load factor specified in the contract necessitates the use of these auxiliary plants to carry the peak during limited periods of the day. In addition, the ever-present possibility of low water and consequently restricted hydro-electric power makes it necessary to hold the steam plants in readiness to carry a portion of the load in the event of such a contingency. They are also available as stand-by plants in case of failure of either water or purchased steam power sources.

Before the company contracted to obtain hydro-electric energy from Keokuk, the United Railways had in operation three steam power plants of various capacities. Central station had a capacity of 12,000 kw. of direct current, Northern station had a capacity of 6,000 kw. direct current and 2,400 kw. alternating current and Hodiamont station had 3,150 kw. direct current and 3,600 kw. alternating current. During this period a contract with the Union Electric Company of St. Louis allowed the railway to draw on the power company's plants for a demand load of 18,000 kw. This was available at the system load factor, which was approximately 38 per cent.

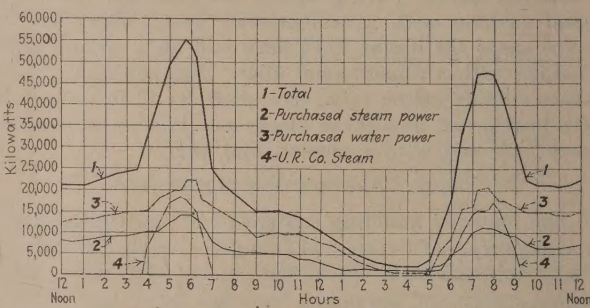
When water power became available at an attractive price, the quantity which could be purchased was limited and the load factor demanded by the power company was considerably above that at which steam power was being obtained. The daily energy allowance under the contract was 295,000 kw.-hr., with a maximum demand allowance of 22,380 kw. This is approximately equivalent to a load factor of 55 per cent. As the purchased steam-generated energy was being obtained at the system load factor, 38 per cent, it would have been necessary to decrease the load factor on this steam service in order to take advantage of the available hydro power. This, obviously, would have seriously increased the cost of energy from the steam power system, even had this been available.

Two of the existing steam plants operated by the railway company were therefore kept in service to absorb the peak loads on the railway system. These two stations are now operated about seven hours a day, four during the morning rush and three during the evening. Hodiamont station was shut down and one 1,200-kw. alternator was moved from there to Northern. Since the locations of the two operating power plants were advantageous for use as distributing points, two 2,000-kw. rotaries were put into Central station and two 1,000-kw. units were put into Northern station. Additional new transformer and rotary converter equipment was installed at various points on the system so as to make available the new 13,200-volt water power.

QUANTITY USED AND COST PER KILOWATT-HOUR OF ENERGY FOR UNITED RAILWAYS OF ST. LOUIS, YEAR 1923

	Total Kilowatt-Hours	Cents per Kilowatt-Hour
Energy generated in company's steam plants	25,391,646	1.520
Steam-generated energy purchased	48,448,800	1.355
Hydro-electric energy purchased	108,894,302	0.697
Total for year	182,734,748	0.899
Average cost at direct-current switchboard		1.189

This was the condition of the power supply system of the property when it was recently decided to install additional substation capacity to carry the load created by the operation of the new cars. Five new automatic substations were recently put in service. These were described in detail in last week's issue of this paper. Although the voltage regulation had been satisfactory in the districts in which the new stations were located, their installation was required primarily to relieve



Daily Load Curve Shows Effect of United Railways' Steam Plants in Reducing Peak for Purchased Energy

overloaded adjacent stations. Their use has increased the voltage in the district to some extent. In addition the greater number of distributing points has permitted the release of approximately 125,000 lb. of copper feeder wire, which was taken down. This wire is being used in other districts to reduce line losses and improve voltage conditions where long direct-current transmission is required and where there is not enough load to justify the erection of additional stations in more advantageous locations. Furthermore, it is expensive to obtain a convenient source of alternating-current power for such stations.

The cost of energy from the two steam stations now operated by the railway company is considerably higher than that of purchased energy from steam, charging only operating and maintenance costs. It is believed, however, that in carrying a portion of the peak load and thereby improving the power factor for purchased energy, their use reduces the total cost of energy appreciably, by making it possible to take full advantage of low-priced water power. Their use as stand-by plants for emergencies also gives them an additional value.

The load which is carried by the three sources and the comparative costs of energy are given in the accompanying table for the year 1923.

Planning Relief for the Pedestrian*

Traffic Relief Is Considered from the Standpoint that It Is the Pedestrian for Whom the Transportation Systems Are Made Necessary—Various Means of Increasing Street Capacity Such as Safety Islands, Loading Platforms, Two-Level Streets and Building Arcades Are Discussed

By Hugh E. Young
Consulting Engineer, Chicago, Ill.

PEDESTRIAN traffic should be analyzed and treated as an integral part of the complete traffic scheme. It is not a by-product of transportation, but is the enabling means whereby the transportation systems are made useful and practicable. It is therefore of vital interest to the transportation lines that the pedestrian has a convenient and safe access to the terminals at the beginning and end of his journey. Pedestrians, by virtue of prior right, have first claim on the right-of-way of our thoroughfares.

In most cities the authorities are more particularly concerned with the regulation and control of vehicles moving and meanwhile let the pedestrian traffic take care of itself.

The widespread use of the automobile has a sinister aspect in the 15,000 persons killed on the highways of this country last year and the 1,700,000 injured. Our thoroughfares have practically become the right-of-way of the motorist. The pedestrian is left to shift for himself at street crossings. In Chicago and environs 720 persons were killed last year, and in New York 1,000 were killed.

If the railroads had killed 720 persons in Chicago last year, they would have been forced to elevate their

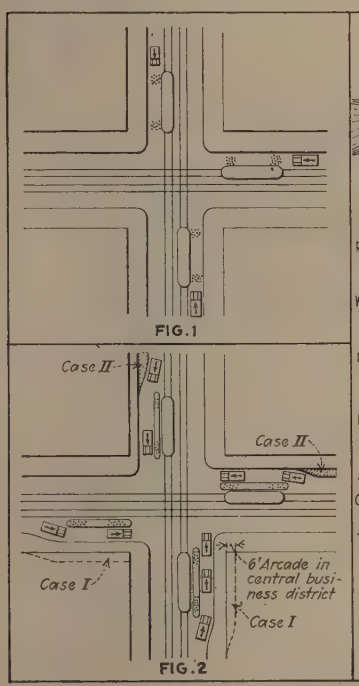


FIG.1 FIG.2

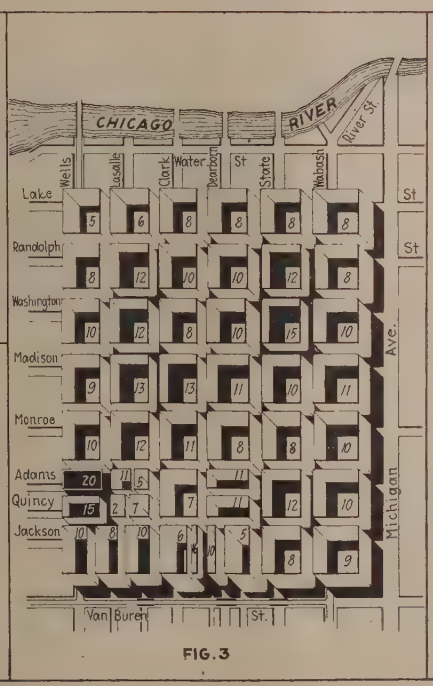


FIG.3

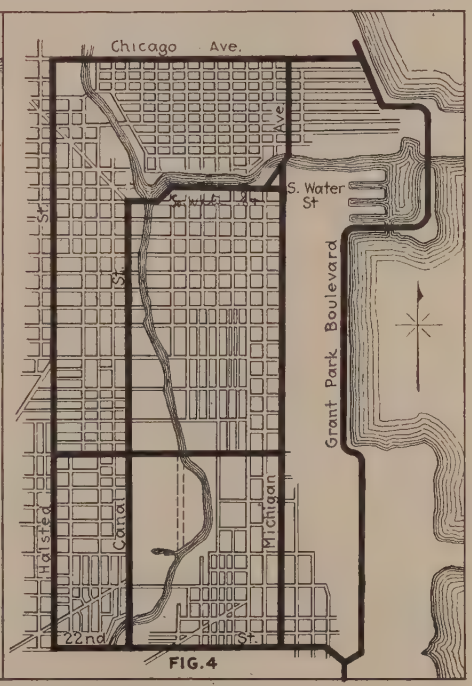


FIG.4

The Increasing Intensity of Congestion Is Due Largely to Concentration of Buildings in a Small District

Fig. 1—Present conditions at street intersections, showing how traffic is blocked by loading street cars.

Fig. 2—Proposed widening of roadway at intersection to provide space for loading platform. (I) Maintaining full width of walk. (II) Utilizing space between walk and curb.

Fig. 3—The average height of buildings in the Loop at the present time compared with the height allowed by ordinance. The black outlines show the present average height by blocks, while the light outlines show the height limit, 264 ft. Figures indicate the present average number of stories.

Fig. 4—The Chicago Plan provides for wide quadrangle streets permitting through vehicle circulation outside the congested Loop District.

than with the rights and conveniences of the pedestrian. The 10 per cent of our population in vehicles has created our traffic congestion problem, as a result of which millions of people are inconvenienced and endangered every day on our streets and highways. The principle now followed is to keep the vehicle traffic tracks or be banished from the city. Already the city has caused the railroads to spend $100,000,000 in elevating their tracks in order to avoid grade crossings, but little attention is paid to the casualty list resulting from the 260,000 motor vehicles loosened on our streets without schedules, without right of way, without semaphore signals.

Figures for the casualties caused by automotive ve-

*Abstract of a paper presented at the convocation of the Western Society of Engineers, Chicago, Ill., Feb. 6-7, 1924.

hicles of various kinds, in Chicago, have been published in various reports. Because the truck, bus and cab are used more intensively than the private automobile, a correction should be made, based on the hourly use and flexibility of each class of vehicle. Giving the cab a factor of 100, the bus 70, the truck 50, and the automobile 30, and applying these corrective factors, we derive the following results:

Type of Vehicle	Number of Cars	Number of Cars X Factor	Number of Vehicles per Death
Automobile	234,000	70,200	184
Truck	45,000	22,500	153
Taxicab	5,500	5,500	52
Bus	230	161	54

A daily pedestrian traffic movement of approximately 10,000,000 takes place in Chicago. Of these about 3,000,000 are to, from and in the central business district, and about 7,000,000 are to and from the manufacturing and industrial section outside the central business district, and between the home and local factory, store, mill, or other place of employment. The pedestrian usually finds it necessary on his trip to cross streets and perhaps a railroad right-of-way, and to dodge street cars and motor vehicles before boarding the vehicle in which he rides to his destination.

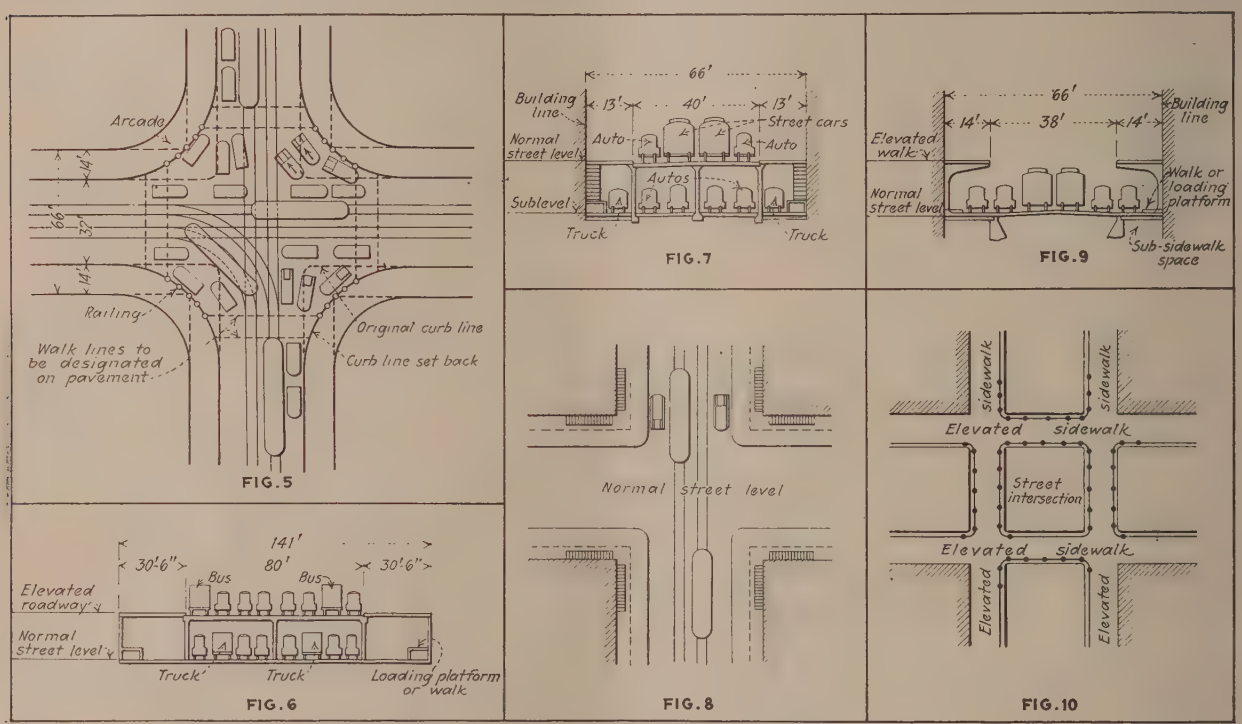
Adequate Safety Islands and Loading Platforms Practical

The most practical and economical means of protecting and directing pedestrians at loading and unloading points in business districts where subways or elevated passenger bridges are not practicable is adequate provision for loading platforms in the streets, supplemented by safety islands opposite such loading platforms. Such loading platforms and islands require lighting and maintenance, but this provision is as logical, consistent and important as the other items for which the taxpayers' money is expended.

Islands and platforms will require additional roadway space at these points. This can be obtained by using the sidewalk space when available, otherwise by condemning property opposite the area affected. This plan is shown in Figs. 1 and 2. The feature of loading platforms and safety islands is used quite extensively in many American cities, but in general provision is not made for maintaining the full width of roadway.

The main cause of congestion in the Loop District of Chicago is the concentration of enormous business in a small area, housed in a comparatively few blocks in buildings of great height and fed by all classes of transportation. We have an average of ten floors over the entire area. Fig. 3 shows the average height of buildings in each block in the most congested district in the Loop, also the height limit to which each block can be constructed in accordance with the building ordinance. This development, of course, would seem impracticable because it is doubtful that the means of transportation, now inadequate, could be doubled to meet the additional traffic that would be developed. The present average height of buildings in the Loop District is ten stories, and even with subways the present street facilities would be inadequate to handle the traffic.

Pedestrian traffic counts made in 1923 by Major R. F.



Some of the Plans for Separating Pedestrian and Vehicle Traffic

Fig. 5—This plan for relieving congestion at intersections provides for the setback of the curb and marked walkway lines for pedestrian crossings.

Fig. 6—A cross-section of the present two-level street on Michigan Avenue north of the Chicago River.

Fig. 7—Cross-section of a 66-ft. two-level street, with second roadway beneath the surface.

Fig. 8—Plan of the upper or surface level of the two-level street shown in Fig. 7.

Fig. 9—Cross-section showing arrangement of elevated sidewalks.

Fig. 10—Plan of elevated sidewalks shown in Fig. 9.

Kelker, Jr., chief engineer for the committee on local transportation of the City Council, showed that there were forty-one buildings for each of which more than 4,000 people passed out in six hours. These counts showed an average movement of 22,100 persons every fifteen minutes, with a maximum of 38,140 persons for each fifteen-minute period during the rush hours.

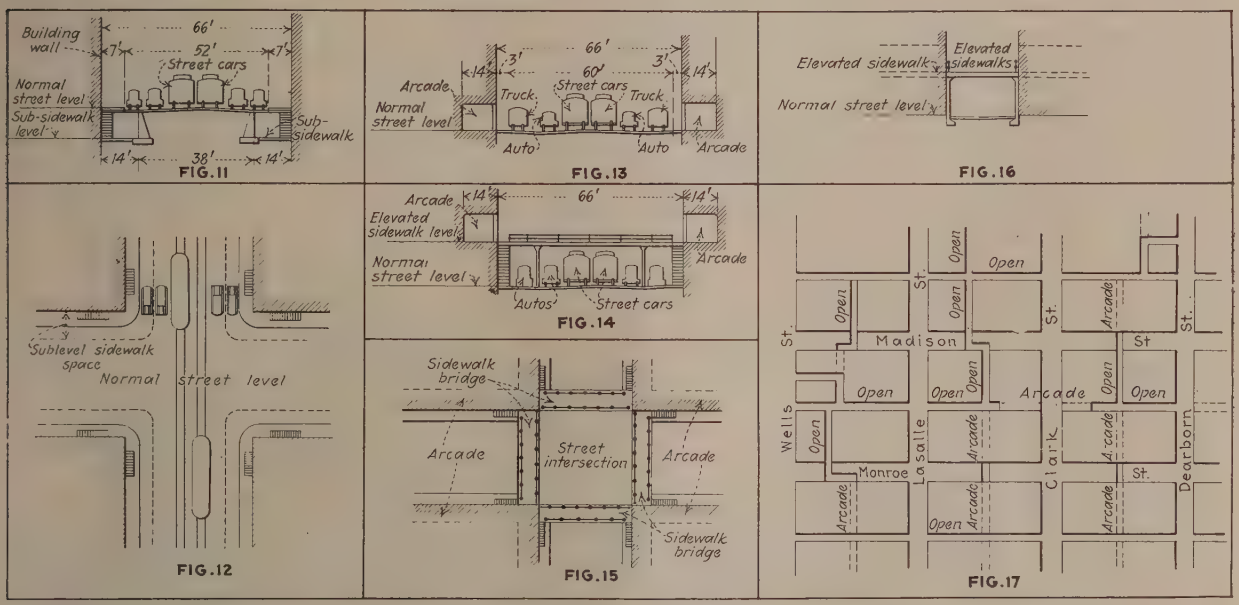
The intensity of pedestrian traffic is confined largely to the central business district and densely built up sub-centers. In Chicago 1,000,000 people travel to the Loop and back again daily. Nearly three-quarters of a million people land on the downtown street systems in a space of about two hours in the morning and rush away again at the close of the working day in an even shorter time. Streets of the Loop, the great clearing house for more than 3,000,000 people, are jammed with pedestrians all day long—3,000,000 pedestrian trips are made every day into, away from and between the large buildings of the Loop.

Taking the street cars off the streets and putting them into subways would not entirely relieve the traffic hazard from the standpoint of the pedestrian. It would help, no doubt, but after all the street cars carry 74 per cent of the passengers and only form about 10 per cent of the number of vehicles in the Loop.

The various schemes to facilitate the movement of traffic and the reduction of danger to pedestrians may be divided into three groups. The first includes improvement in present traffic facilities; the second deals with general improvement to the city as a whole; the third covers special developments dealing with particular locations such as the Loop District, which represents only one-quarter of a square mile or only one eight-hundredth of the city's area.

Group No. 1 includes improvements which could be put into effect at once without waiting for the construction of major projects. These would relieve to a limited extent the rapidly increasing street congestion. Their success will depend upon the degree with which the traffic regulations are enforced. Among the temporary expedients which would give some measure of relief are:

1. Prohibiting parking of vehicles on car line streets.
2. Safety loading spaces at street car and bus stops.
3. Traffic in the Loop District should be governed by the movement of pedestrians instead of vehicles, even though this increases vehicular congestion.
4. Signals maintained and operated by the city should be provided at all important street crossings.
5. Through routing all classes of vehicular traffic as well as street cars. Cars and buses that cannot be through-routed should be turned back at the edge of the congested district.



Arcaded Sidewalks and Elevated Sidewalks in Alleys Are Means of Increasing Street Capacity

Fig. 11—Cross-section of street with sidewalks beneath the street level.
Fig. 12—Plan of street with normal and subway sidewalks.
Fig. 13—Cross-section of street showing building arcades on the normal street level.
Fig. 14—Cross-section of street showing arcades on elevated level.
Fig. 15—Plan showing arrangement of arcades on elevated level.
Fig. 16—Cross-section showing elevated sidewalk in alley.
Fig. 17—Plan showing location of alleys in one section of the Loop District, with elevated sidewalks partly in arcades.

6. The quadrangle streets of the Chicago Plan provide wide thoroughfares outside the Loop District to avoid excessive right and left-hand turns in the Loop (Fig. 4).

7. Streets should be marked with lanes for pedestrian traffic. A "Through Street" stop signal should be placed on all through street crossings to warn and direct the pedestrian.

The improvements possible in Group 2, comprising those applying to the city as a whole, includes the following:

1. Construction of loading platforms lighted and maintained by the city at all principal corners, such as those shown in Figs. 1 and 2 and referred to previously.
2. Safety islands, lighted and maintained by the city, at complicated street intersections, such as at a diagonal street.
3. Cutting back street corners to the lot line and arcading buildings at the corners for sidewalk pas-

sages. A street crossing at some distance back from the corner would enable pedestrians to pass without interference from right and left-hand turning vehicles (Fig. 5).

4. Construction of two-level streets on important truck thoroughfares in the congested area (Fig. 6).

Group No. 3 includes various special developments for the relief of congestion within the Loop area. It comprises many schemes, each of which has certain advantages and disadvantages. Some of these plans are given briefly below.

System of Two-Level Streets

A comprehensive system of two-level streets throughout the entire Loop District has been proposed, with the lower level depressed beneath the present surface. This plan, shown in Figs. 7 and 8, has a number of advantages, chief among which are the following:

Local vehicle traffic could use the lower level, thus facilitating through automobile and street car traffic on the upper or normal street level. Business property would have frontage on both levels, so that all trucking to buildings in the Loop could be handled on the lower level, thus giving convenient access to railroad and boat freight terminals or delivery stations. Automobiles could be parked on the lower level along the building fronts, if desired. The street capacity, of course, would be doubled by having two levels.

The principal disadvantages are: The two-level development would require radical changes in existing building arrangements. The lower level streets would require an elaborate ventilating system to eliminate the carbon monoxide danger. Pedestrian traffic would not be materially improved. A rebuilding of the utilities in the streets probably would be required. The high cost naturally is a disadvantage.

Two Levels on Selected Streets

The corollary of the last plan would be the selection of certain north-and-south and east-and-west streets for the two-level plan, supplemented with elevated sidewalks on the remaining thoroughfares. By this means the automobile and pedestrian traffic could be separated on the two-level streets from commercial vehicle and street car traffic. The streets on which the two-level structures would be placed would have the advantages previously cited for two-level streets.

The objections would include all those mentioned for the more comprehensive plan, and also the two-level streets in connection with elevated sidewalks would lack accessibility unless side ramps were provided, which would take space and would require extensive condemnation of property.

Elevated Sidewalks

A comprehensive system of elevated sidewalks, as shown in Figs. 9 and 10, would give the pedestrian a free way for travel in the entire Loop District, and would permit the present sidewalk space on the normal street level to be used for roadway purposes. The traffic capacity of the street would thus be more than doubled.

The main objection to the elevated sidewalk is that it destroys the utility of the existing building arrangements. Stairways at frequent intervals, and bridges over the street intersections, would be required. The varying height of the floor lines of adjacent buildings makes it difficult to construct a sidewalk to fit the present buildings without the use of stairs. An objection of vital importance in Chicago is the obstruction offered to the construction of such a system of sidewalks by the present elevated railroad system.

Sub-Sidewalks

A somewhat similar arrangement could be had by placing the sidewalks beneath the present street level, as shown in Figs. 11 and 12. This would give a free sidewalk space for pedestrians independent of other traffic. The Loop buildings could have show windows on both floors, thus increasing the display space. Cutting down the width of the normal street-level sidewalk to 7 ft. would provide for an additional line of traffic in each direction. This would more than double the capacity of the street for vehicular traffic. Stairways at street intersections would give pedestrians access to the street level, as well as to the basement floors of all Loop buildings. The sub-sidewalks would provide protection from the elements, and would give convenient access to any proposed subway system.

On the other hand, the construction of passageways under the street intersections would be difficult and expensive on account of the present utilities in the street. There would be difficulty in the lighting and draining, and additional police protection would be required. The removal of the space now occupied by buildings beneath the sidewalk would be necessary.

Street Car Subways

Street car subways would increase the schedule speeds possible with the cars, would reduce traffic congestion to the extent that it is caused by the street cars on the surface of the street and would remove the hazard of loading passengers on the street; but it would still expose the pedestrian to the hazard of automotive surface vehicles.

Building Arcades

Arcades of the buildings on the present street level are shown in Fig. 13. This arrangement would allow the existing sidewalks to be used for roadway space, increasing the capacity of the street. Pedestrians would be protected from the elements, which would be of advantage with the additional window display that should be provided for the buildings. The area under the present sidewalks can be covered with reinforced concrete slabs to support the pavement, using the space on each side of the street for a public utility gallery.

This construction, however, presents a series of legal, financial and construction problems and it does not provide any improvement in traffic conditions at the street intersections.

Arcades on the second floor level, Fig. 14, should have all the advantages of the ground level arcades, and in addition should be made to serve as elevated sidewalks by the construction of bridges over the streets. They have the same disadvantages as arcades on the first floor, and in addition there is lack of accessibility. The variation in height of the second floors of the buildings presents a difficult construction problem. The legal and financial objections also hold.

Elevated Sidewalks in Alleys

In Chicago there is a quite extensive system of alleys, so that elevated sidewalks might be installed in some cases in them. This construction, shown in Fig. 16, would give all the advantages of elevated sidewalks on

the street with respect to the movement of pedestrians. It would also reduce the number of extensive structural changes, as compared with second floor arcades and elevated sidewalks on the streets. It would create an independent means of pedestrian circulation at the second-floor level throughout the Loop.

There would be a number of disadvantages and limitations to this plan. It would require bridges over street and alley lines, as shown in Fig. 17. The blocks in the Loop District usually have alleys in one direction only, and these are not all in straight alignment. In blocks where alleys do not exist, it would be necessary to create arcades through the buildings. The roofing over the alleys would form a serious obstacle in the fighting of fires in adjacent buildings.

It is not the development of any one system of transportation alone that will best serve the pedestrian in his journey from home to place of employment and back again. It is the harmonious combination of the automobile bus, street car, elevated car and steam road transportation system which is necessary for the solution of the Chicago Loop traffic problem.

The problem of providing adequate means of transportation and safeguarding pedestrian traffic is acute. It is obvious that the problem in the Loop must be solved by the development of several traffic levels owing to the nature of the building development. It has been demonstrated by a very exhaustive study of local conditions and similar construction in other cities that a lasting street development in a vertical direction is practicable and is not an impossible engineering undertaking.

Progress in Interurban Freight in 1923

In Three Central States Material Additions to Net Revenues Have Been Made by Handling Freight—Over a Thousand Cars Now Used, and Daily Loadings Approximate 500 Carloads

By T. H. Stoffel

Railway Department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

A Twelve-Car Locomotive-Drawn Freight Train on the Interstate Public Service Company's Lines

THROUGH the handling of freight, the electric interurban railway is becoming an increasingly important factor in the life and prosperity of the communities and territory served. This is particularly true in the industrial section comprising the States of Indiana, Ohio and Michigan, which now boasts a network of interurbans aggregating more than 4,000 miles and serving practically every community of importance in that territory.

While the average interurban line was not designed physically for the handling of freight, it is readily adaptable to the transportation of certain classes of both carload and less-than-carload commodities, of which there is an enormous tonnage available in the territory mentioned.

For many years the freight service rendered by interurban lines was confined to the transportation of small packages, etc., which could be taken care of in the baggage compartments of passenger cars. This was undertaken more as an accommodation to shippers than for the revenue involved. The continual demands of the public, however, made it necessary gradually to provide and add special equipment and facilities to take care of freight tonnage, and the development of this phase of traffic almost automatically reached a common carrier basis.

It is only in recent years that electric railways have made any attempt to analyze their freight service from an income and cost standpoint. It is generally conceded that any allocation between freight and passenger business, made with a degree of fairness, indicates that the transportation of freight is highly profitable for electric lines. Investigation has invariably developed that the net returns from freight operation, when properly and economically conducted, are much greater than from passenger traffic, based on the additional investment required for this service, and which is comparatively small, inasmuch as the major facilities necessary to conduct a freight business, such as roadway, track, power plant, executive and operating organizations, etc., already exist. Of course this statement is predicated on the fact that the railway is already fully equipped

On the Dayton & Troy Line "Baggage Car" Locomotives Are Used in Freight Service

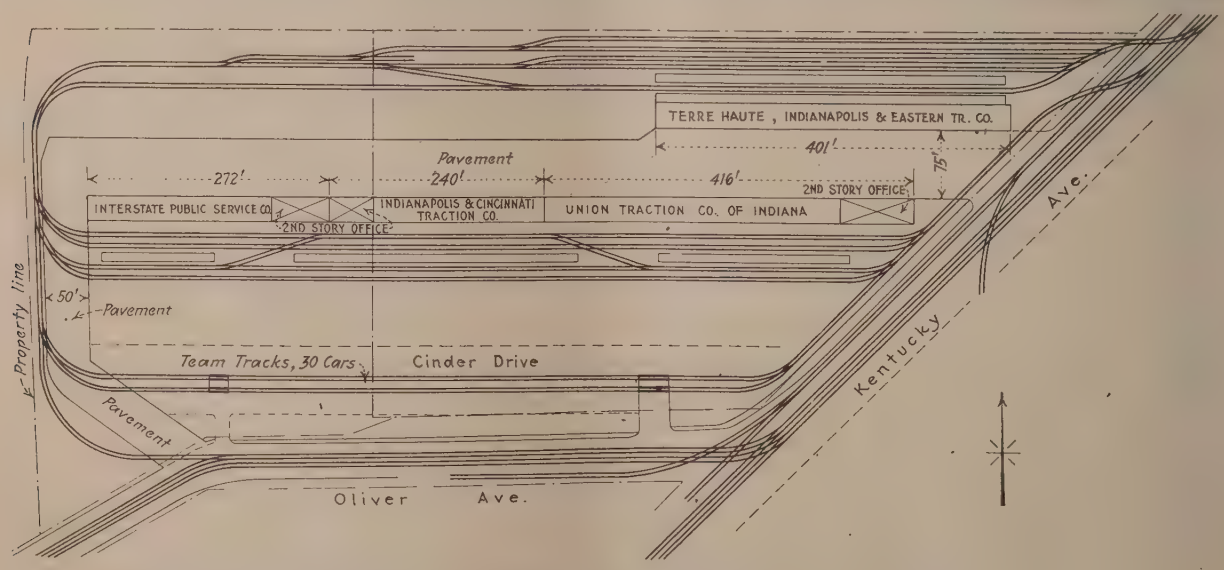
for passenger business and has a complete operating organization for that service.

Much progress has been made in the last year or two in the development of freight operation, until at the present time approximately 275 motor box or express cars, 700 trail box cars, a score of electric locomotives. 100 stock cars and many cars of other types are employed in freight service in the territory under discussion. The average daily loading aproximates 500 cars, most of which are moved at night, when pasenger service is curtailed or discontinued, thus making unnecessary any additional investment in power machinery, and at the same time increasing the load factor of existing power facilities and tracks. Power plants and rails which were previously practically idle between 10 p.m. and 6. a.m. are now kept busy twenty-four hours of the day in revenue producing service. Freight trains of from four to eight or ten cars are the rule rather than the exception, and on some roads, notably the Detroit United Lines and the Interstate Public Service Company, trains of from ten to twenty cars each are hauled with electric locomotives. Thus the added benefits are secured of lower train labor and power costs per car or per ton-mile resulting from the handling of heavier train units, and at the same time movement over the road is expedited, since freight and passenger trains do not conflict.

The development and handling of this great tonnage have brought up many problems new to interurban operation. Such, for example, are the making and publishing of through joint rates and divisions, and necessary rules and regulations governing them; the methods of auditing interline accounts; establishing of through operating routes; the interchange of equipment in joint service; standardization of rolling stock for through interline movement, etc. Much credit is due the traffic, auditing, and mechanical associations affiliated with the Central Electric Railway Association for the progress which has been made in arriving at satisfactory solutions of these problems.

Notwithstanding the large tonnage handled during the past year or two by electric lines in the central territory, the rolling stock, terminals and other freight facilities have been wholly inadequate to take care of more than a fraction of the business available, and the movement necessarily has been confined largely to less-than-carload or merchandise shipments.

This shortage of cars, together with the lack of team track facilities for loading, has prevented the securing of a vast amount of the more remunerative and desirable carload tonnage which is available. However, straight carload business has not been entirely neglected, as is attested by the hundreds of cars of such commodities as iron and steel articles, rubber tires, cement, building material, livestock, etc., that have been moved. While in most states the handling of livestock by interurban lines is prohibited by law, special legislation permits this in Indiana. As a result, the group of electric roads centering in Indianapolis handled 11,596 carloads of livestock to and from Indianapolis stock-



The New Union Freight Terminal at Indianapolis Will Have Warehouse and Track Capacity of 100 Cars

yards during 1923, which was approximately 30 per cent of the total receipts at those yards.

Generally speaking, the character of the freight service to be had on interurban electric lines is far superior to that furnished by any other means of transportation. Trains for handling interline business have been so scheduled that shipments moving over from two to five or six different lines, and for destinations up to 300 or more miles, are available for delivery to consignees within forty-eight to sixty hours, which is frequently from two to ten days better than the service provided by steam roads, and in many cases is better than can be obtained from the American Railway Express at considerably higher rates.

The value of the service which can be rendered by electric interurban roads is emphasized by the fact that the Southeastern Express Company, operating over the steam roads of the South, has contracted with the Interstate Public Service Company for the handling of its express service into Indianapolis and for destinations beyond, via Louisville. This business formerly moved via other Ohio River crossings in connection with steam line service.

Many extensions in joint rate and traffic arrangements have recently been negotiated and put into effect among the Ohio-Indiana-Michigan electric lines, and through merchandise cars have been scheduled covering practically all important terminals in the territory. For example, overnight delivery of shipments is made between Canton, Akron, Cleveland, Ohio, and Toledo, Detroit, Lima and Fort Wayne; between Detroit and Grand Rapids, Kalamazoo and Jackson, Mich.; between Indianapolis and Louisville, Fort Wayne, South Bend, Dayton, Springfield and Terre Haute. Second-morning delivery is assured between Cleveland, Toledo, Detroit and Indianapolis, Springfield, Dayton, Columbus, Ohio, and between Louisville and South Bend, Ind. Third-morning delivery is given between Louisville and Detroit, Cleveland, Toledo, etc. These are merely a few of the joint operating schedules which have been put into effect and are maintained. Still further improvements are under way and will be made operative soon.

Undoubtedly more progress was made during the year 1923 than in any similar period. Several hundred cars have recently been added or are on order, and terminal warehouses and facilities have been enlarged and new ones constructed at important points. Probably the most notable terminal improvement in the country is that now under construction at Indianapolis at a cost of approximately $1,000,000. This terminal will be used jointly by the Terre Haute, Indianapolis & Eastern Traction Company, the Interstate Public Service Company, the Union Traction Company of Indiana and the Indianapolis & Cincinnati Traction Company. It is expected that the first units of this terminal as planned will be ready for service by April 1.

The immediate facilities at this terminal, as shown in the line drawing, will consist of the present T. H., I. & E. warehouse, which is about 400 ft. long and which will later be extended to double that length, and a warehouse 928 ft. long now nearing completion. To begin with, the terminal will have warehouse and transfer track capacity of approximately 100 cars at a single setting, and team track space for an additional fifty to sixty cars. Separate offices will be provided for each of the lines using the terminal. More space is available on the terminal property for another warehouse about 800 ft. long and also additional team tracks, which will be installed as the business develops. This new terminal will obviate delays to trucks and vehicles in delivering consignments for shipment, and will effect material economies and at the same time expedite movement in the interline transfer of freight.

With adequate terminal facilities and sufficient rolling stock to take care of the business, it is estimated that from three to four times the tonnage handled at present may be had by electric lines in the territory under discussion, with possibilities for still further development.

Telling the Railway Story to the Public in East St. Louis

BEING a firm believer in the value of newspaper space for winning public good will, W. H. Sawyer, president the East St. Louis Railway, has for several years been conducting a series of talks with his customers—the riding public—through this medium. The results accomplished have been so good that the company is now preparing a booklet for distribution to East St. Louis business men, local organizations and executives of other railways, illustrating samples of various types of newspaper advertising used during 1923. In a foreword Mr. Sawyer says: "I believe in newspaper advertising—hence this booklet to show by a few typical 'ads' how we used newspaper space in 1923.

"A few of our outstanding reasons for advertising are:

1. We believe it is our duty to our customers to keep them informed of what we have done, what we are doing, and what we are trying to do.
2. As a purely business proposition we should sell transportation, merchandise our wares, and the best way to do this is through the columns of the newspaper.
3. Our advertising has been most helpful in enlisting the loyalty and co-operation of my associates who have a just pride in both our endeavors and our accomplishments.

"Just one further thought—advertising is worse than useless unless backed up by actual performance. To inspire respect and confidence through advertising we must be wholly honest in our endeavors to give service—efficient, satisfactory service—to our customers."

The advertisements are run chiefly in the East St. Louis local daily paper. An insertion is made in each Sunday issue and several are run during the week. The contents of each insertion are made as simple and direct as possible. The company's policies, courtesy of trainmen, safety, desire for co-operation, cleanliness of cars and financial statements are the principal subjects. The space used is rarely very large and great care is taken to avoid anything spectacular.

An attempt is made to take part in all local events of general interest. Paid advertising space is frequently used for this purpose with the idea of identifying the company with local civic activities.

Among the terse comments made by Mr. Sawyer in the booklet are the following:

To promote public safety it is necessary to secure public co-operation—and the use of newspaper advertising is essential.

Courteous, helpful motormen and conductors plus good service properly advertised make appreciative satisfied customers.

Co-operating customers will commend courteous conductors—if you give them a chance.

Our customers are certainly entitled to complete financial data—also to honest explanations as to any delay in service.

These ads assist our customers in appreciating that a token dropped in the fare box pays for the service received and no more.

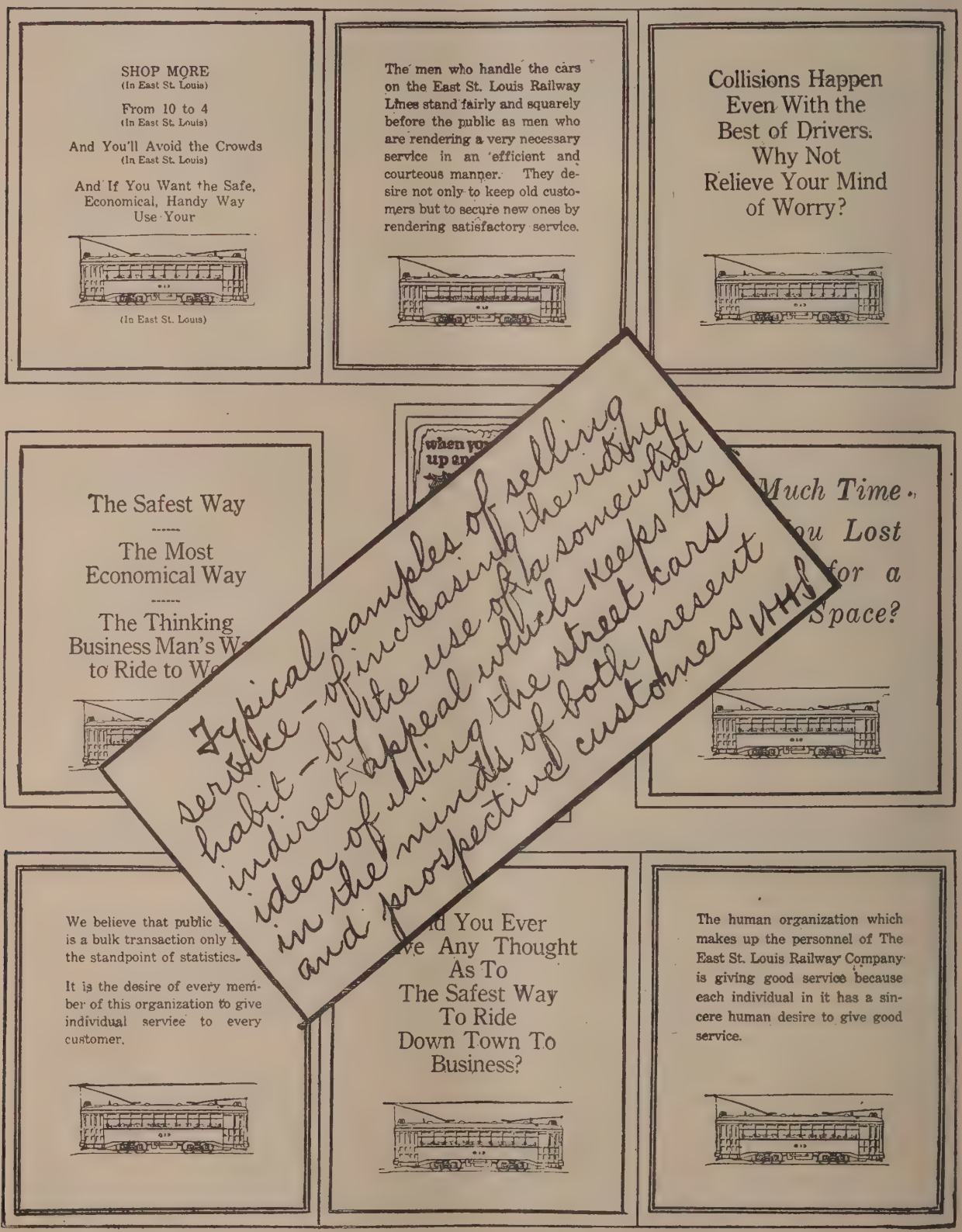
We believe that our customers should be kept posted on

the facts concerning municipal ownership of transportation systems so they will not make the mistake other cities have made.

It is a part of our duty to give publicity to endeavors of a semi-public nature which are beneficial to our home community.

The interest of the company and the civic community are mutual and advertising that helps develop civic pride is mutually beneficial.

Holiday greetings give us an opportunity to tell our customers how we appreciate the way they have met our efforts to give good service.


SHOP MORE
(In East St. Louis)
From 10 to 4
(In East St. Louis)
And You'll Avoid the Crowds
(In East St. Louis)
And If You Want the Safe, Economical, Handy Way Use Your
(In East St. Louis)
The men who handle the cars on the East St. Louis Railway Lines stand fairly and squarely before the public as men who are rendering a very necessary service in an efficient and courteous manner. They desire not only to keep old customers but to secure new ones by rendering satisfactory service.
Collisions Happen Even With the Best of Drivers. Why Not Relieve Your Mind of Worry?
The Safest Way
The Most Economical Way
The Thinking Business Man's W
to Ride to W
Much Time
u Lost
for a
Space?
Typical samples of selling service - of increasing the riding habit - by the use of a convenient indirect appeal which keeps the idea of using the street cars in the minds of both present and prospective customers
We believe that public
is a bulk transaction only
the standpoint of statistics.
It is the desire of every member of this organization to give individual service to every customer.
d You Ever
e Any Thought
As To
The Safest Way
To Ride
Down Town To
Business?
The human organization which makes up the personnel of The East St. Louis Railway Company is giving good service because each individual in it has a sincere human desire to give good service.

Association News & Discussions

Chicago Transportation Discussed by Western Society of Engineers

Relation of Various Elements in Traffic Problem Analyzed—Elevated and Subway Sidewalks, Elimination of Street Crossings for Pedestrians, Traffic Signals, the Motor Bus and Steam Suburban Traffic Discussed

LOCAL transportation in Chicago was the subject of the mid-winter convocation of the Western Society of Engineers, held in Chicago Feb. 6 and 7. The papers dealt with practically all phases that make up the traffic tangle in that city, including the private automobile, taxicab, pedestrian, street car, elevated lines, motor bus, and the steam suburban line.

Various suggested schemes were discussed for facilitating pedestrian traffic and safeguarding the pedestrian, both in the congested Loop area and the outlying business areas. Papers on design and construction costs for elevated sidewalks, by J. H. Sawyer, bridge designing engineer Bureau of Engineering, and T. A. Evans, designing engineer Board of Local Improvements, city of Chicago; private automobile traffic, by Z. C. Elkins, manager Chicago Motor Club; through streets, by E. S. Taylor, office manager Chicago Plan Commission; and synchronized signal control, by William G. Beard, safety director Yellow Cab Company, were abstracted in this paper, issue of Feb. 9. Various schemes for facilitating and protecting pedestrian movement were discussed in a paper by H. E. Young, consulting engineer, Chicago, abstracted elsewhere in this issue.

In the discussion it was stated that although the traffic control signals installed on Michigan Avenue had slightly slowed down the average time of a trip through the traffic controlled area in the non-rush period, it had materially expedited the movement of vehicles during the rush. It was also contended that the extension of this system to the remainder of the business area would be impracticable and would materially retard the movement of street cars even beyond the existing conditions.

Co-ordinating Bus and Trolley

Bus operation as a factor in local transportation was discussed by J. A. Emery of Ford, Bacon & Davis, consulting engineers. Mr. Emery spoke in place of John A. Ritchie, who was unable to be present. Mr. Emery stated that the American people were primarily interested in good service and were willing to pay for it. "The rate of fare," he said, "should be determined on the basis of the quality of service rendered, and the education of the public to this fact is the paramount issue in the solution of the transportation problem in all communities.

"The motor bus in the local transportation problem of large communities has a real opportunity for service. It can be operated where only very light traffic exists. Under general conditions the motor bus can be supported on a population of 250 per mile, whereas under present price conditions, a street railway would require at least 1,500 per mile for like conditions. Where it is operating over city boulevard and park systems, the double-deck bus creates a large proportion of its own business. Analysis of the business of the New York and Chicago coach lines has shown an estimated pleasure riding of 25 per cent of the total. For a totally motorized city service, however, it is not expected that the proportion of pleasure riding would be as large as this."

One phase of bus operation which has not received the attention which it warrants is the adaptability of the bus to a combination of local and express service on the same street, Mr. Emery stated. In addition, there was strong reason to believe that the bus could be combined with existing car service in some places, so as to give a combination of express and local service, the cars running express and the buses carrying passengers along the street between the express stops.

Still another important possibility of bus operation, Mr. Emery believed, is a graded service. Many people would be willing to pay a higher fare for an assured seat, more comfortable ride, or saving in time.

One problem connected with the operation of motor buses which Mr. Emery brought out, is that of determining the wear on pavements resulting from their operation. When the bus is required to pay this cost, a considerable advantage which it now enjoys over the street car will be eliminated.

Steam Railroad Suburban Transportation

The extent and scope of steam railroad suburban transportation in Chicago and its suburbs was treated in the report of a special committee of which F. E. Morrow, assistant chief engineer Chicago & Western Indiana Railroad, is chairman. This report traced the history of this form of transportation from its inception for the steam railroads handling suburban traffic in Chicago. After a review of the service furnished by each of these roads, the committee concludes that its greatest value is in those sections where the character and employment of the residents require rapid transit to the central part of the city, and that its growth depends largely on the growth of the communities which it serves. The service furnished is the truest type of rapid transit in the city. This is attained by having relatively few station stops along the line; motive power that is capable of high speed and roadbed that will sustain it; by providing tracks with few obstructions and no congestion, and by having at most only two downtown stations that are located within easy walking distance of the Loop.

Due to the competition from elevated and surface lines, which offer frequent service within the city moderately close to the Loop, combined with the growth of suburban communities, the steam railroad haul has constantly become longer. The steam suburban lines, except the Illinois Central, are not well suited to handle short-haul traffic, because such traffic would interfere with the speed at which the long-haul traffic could be handled, which would be a distinct loss to the suburban communities. In addition the districts of short-haul traffic are in most instances populated densely enough to support other forms of local transportation which afford more frequent service.

The Illinois Central, being favorably located and having a sufficient right-of-way to provide not only separate tracks for this service, but also local and express tracks, is enabled to provide both local and express service without interference with the two kinds of suburban service, and also without interference with its other railroad business.

C. H. Mottier, office engineer Illinois Central Railroad, outlined some of the details connected with the new Illinois Central suburban development. George W. Hand, assistant to the president Chicago & Northwestern Railroad, stated that suburban business should only utilize latent facilities available on a given property. The extent of this operation must, however, necessarily be limited and dictated by the primary consideration of providing adequate trunk-line service. Due to the high investment in terminals and right-of-way, and the extreme importance of providing for future expansion, he considered it highly impracticable to use steam railroad right-of-way for rapid transit service. Any permanent assignment of existing facilities to such purposes will usually be followed by the necessity of acquiring more right-of-way facilities to handle the pressing needs of increasing through business.

Extent of Chicago Transportation

A paper by Britton I. Budd, president Chicago Rapid Transit Company, making suggestions for future rapid transit development in Chicago, was read by E. J. Blair, assistant to the president. This paper is abstracted elsewhere in

this issue. In the discussion, Mr. Blair said that the load factor of the elevated lines in Chicago is approximately 35 per cent, that is, the total number of passengers carried in twenty-four hours is 35 per cent of the number carried in one hour during the maximum peak, multiplied by 24.

C. V. Weston, consulting engineer Chicago Surface Lines, read a paper on the Surface Line traffic, which is abstracted elsewhere in this issue. R. F. Kelker, Jr., commented on this and some of the more important phases of the other papers which were read during the meeting. He illustrated the tremendous increase in riding habit and the demand for transportation in the United States, by pointing out that although the population had increased only 20 per cent in the twenty years 1900-1920, the ton-miles and passenger-miles on carriers had trebled. With a population increase rate of approximately 1 per cent per year, this vast increase in the demand for transportation had occurred.

Elimination of parking in the Loop area, he contended, would give a considerable measure of immediate relief from congestion. He commended Mr. Elkins for his broadminded stand on this subject, and approved the idea proposed by Mr. Elkins, of having a separate traffic commission with control of traffic throughout the city. Rigid traffic regulations must be instituted and enforced before any permanent improvement in the conditions in the business can be affected. Unless this is done, Mr. Kelker said, every improvement in the Loop will result in attracting an additional number of private cars into the business district, and the condition will thus again be aggravated.

Pedestrian accidents in the congested district, according to Mr. Kelker, are low in number compared with those in the outlying sections of the city.

Connections between the various lines of steam railroad suburban lines and a rapid transit system, at certain outlying points, was suggested as a means of relieving the congestion due to suburban traffic. A unified transportation system under unified management was held to be the only way successfully to settle Chicago's transportation requirements.

A tentative report including basic principles for solving the transportation problem was presented, so as to invite discussion. It is the intention to complete the report and include certain suggestions made at the meeting.

Difficulties Other than Physical in Transportation Relief

At the dinner Mayor Dever pointed out that the physical phases did not constitute the most important parts of the transportation problem, holding the financial and legal phases to be even more important and difficult of solution. Any plan must be submitted to a vote of the people. The difficulty in financing an extended system is that under existing law it is impossible to grant a franchise of sufficient duration to allow the development to be carried out with private funds. As the representative of the city's interests in the solution of the transportation problem, the Mayor said that there was no intention to confiscate the property of the existing security holders, but urged the advantage of an early solution, on the ground that if the situation were allowed to go unsettled until after the expiration of the franchises in 1927, securities of the traction lines would become seriously depreciated in value.

Rapid Transit and Interurban Development in Chicago*

By Britton I. Budd
President Chicago Rapid Transit Company

THE existing problem in the development of rapid transit and interurban transportation in Chicago and surrounding territory is largely comprised in the augmentation of present facilities. Rapid transit systems for the large cities of the world did not spring full-fledged into existence, but rather are the product or outgrowth of attempts to supply service along certain local routes which, having been later inter-related or joined, constitute the system.

Chicago alone comes nearest to providing the negative to this statement, in that its present system of rapid transit, consisting of elevated lines, was very largely constructed within a period of seven years. Between 1888 and 1895 there were built the South Side, the Chicago & Oak Park and the Metropolitan railways. Subsequently, in 1900, the Northwestern Elevated came into operation, with its Ravenswood branch as a later extension in 1907, while on the south side the Englewood, Stock Yards and Kenwood branches were built in 1906 and 1907. On the west side the Metropolitan Elevated has from time to time increased its length of operated routes on the Garfield Park branch and Douglas Park branch.

The problem in the development of interurban transportation for the larger territory within a radius of 50 to 100 miles from the center of Chicago is comprised in the addition of suitable terminal facilities, by means of which the operation can be brought to the highest degree of usefulness.

The history of those interurban lines in the Chicago territory, having only limited terminal facilities in the urban district, has not been one of large success from the standpoint of usefulness to the population served. The requirements are principally summed up in the outstanding necessity of adequate interconnection with the rapid transit lines of the urban district.

The value of interurban service radiating from Chicago has not been fully realized, nor has this valuable means of intercommunication been encouraged as it has in most cities in the United States.

Points of Congestion on Elevated

An understanding of the relative density of travel on the various divisions of the elevated systems can best be obtained by a comparison of the number of passengers carried per mile of track. The number of passengers carried per mile of single track is now approximately as follows: South Side, 1,102,000; Metropolitan, 864,000; Northwestern, 742,000, and Oak Park, 632,000. The Union Loop has an average of more than 11,000,000 passengers per mile of single track, while the system as a whole averages 1,106,000.

It is possible to state certainly that either subway or elevated lines are capable of average maximum speeds in express service of 20 to 21 miles per hour. The tendency in subway operation, where train movement must be controlled by a complete system of signals, is to increase the length of trains to ten or twelve cars. This has the effect of reducing the number of trains per hour, so that for a traffic loading of 35,000 to 45,000 passengers per mile of single track per hour the corresponding car movement is 360 to 380 cars per hour. This tendency makes itself manifest in the lengthening of the interval between trains.

In elevated movements, express service, the tendency has been to average about seven cars per train for maximum service under the operating conditions that prevail on the structure, where light and sight permit greater ease of movement. The result has been to obtain under maximum service conditions movement of 400 to 420 cars per hour.

Trend of Future Developments in Rapid Transit

So many plans have been put forward for the development of a comprehensive rapid transit system in Chicago that to present another here, giving exact location of streets, lines and routes, would be superfluous. Suffice it to say that rational extension of the system will undoubtedly be carried out by the building of additional lines, one at a time, as necessity and experience suggest and as financial limitations permit.

The general plan of the Chicago Traction and Subway Commission of 1916, or the plan of the All Chicago Council, both are general in character and cover extensive additions to the present system. It is not only difficult but impossible to plan all the actual routes now that may be required in this city within the next twenty or thirty years, but it is generally agreed that the initial step in Chicago should be the building of a rapid transit subway 4 miles in length on State Street, connecting with the South Side Elevated at Eighteenth Street and running thence north to Lincoln Park, thence west on North Avenue to a connection with the Northwestern Elevated Railroad. The extent of a two-track or four-track construction in this subway

*Abstract of paper presented before convocation of Western Society of Engineers, Feb. 6 and 7, 1924, Chicago. In addition to matter printed here, Mr. Budd's paper, intended primarily for local people, included a review of the extent of the present rapid transit system in Chicago, its relation to the present distribution of population, proportion of traffic handled by elevated and surface lines and comparison of traffic with that on Brooklyn railway lines.

can be proportioned according to the general requirements of the situation. This will quickly relieve the existing congestion in the downtown district and prove as well a great benefit to the system as a whole and increase the rapid transit capacity during maximum hours 125 per cent. The initial subway could then be followed as soon as practicable with other short subways through the downtown district, located so as best to serve the situation as a whole.

It has been estimated that the population of Chicago in 1950 will be 5,000,000 people and the local passenger traffic not less than 2,000,000,000 annual rides. This is entirely within the range of probabilities, and it is almost certain that these traffic figures will be exceeded.

Relation of Subways to Rapid Transit

On account of the prohibitive cost of subway construction, comparatively little of Chicago's rapid transit system should be built as subway mileage. It is true that in the downtown district, where it is vital that the streets be left free for the use of pedestrians and for vehicular traffic and where the Chicago River acts as a barrier which must be passed on two sides of the district, subways for short distances are unavoidable.

It is equally true that with the application of the service-at-cost principle in determination of the future rates of fare on rapid transit lines in this city large additions and extensions to the existing system will have to be installed at a minimum cost. Otherwise, rapid transit in the future will not only be burdened with an excessive fare but the rate of extension of the system itself will be impeded.

The general function of the rapid transit lines should be the movement at maximum speed of mass traffic, especially over the longer transportation routes, where any other means will not suffice. All other means of local transportation within the city can be so related to the rapid transit system as to provide the maximum convenience to the traveling public, especially for distances of comparatively short haul and along routes wherein rapid transit lines may not be provided.

It is not necessary to dwell upon the importance of rapid transit and all other proper forms of local transportation for a city of this size, as that matter will be conceded without contention, but it is important to stress the fact that rapid transit is especially necessary to provide speedy communication not only between the business and residential districts of the city itself but between those districts and the suburban or more remote portions of the corporate area.

In a broader sense the extension of rapid transit to the metropolitan district of Chicago, within a radius of 50 to 100 miles, would mean the development of all suburban and interurban routes within the metropolitan area and the provision of adequate terminal facilities for their operation within the urban district, and especially the relation of those facilities to the rapid transit facilities of the urban district itself.

Development of Chicago Transportation*

Co-ordination of All Transportation Facilities Into Single Operating Unit Urged—North and South Subway for Street Cars Recommended, as Well as Two East and West Street Car Subways Planned Heretofore—Idea Given of Enormous Traffic Handled

By Charles V. Weston
Consulting Engineer Chicago Surface Lines

EVERY growing community has its transportation problem, which is never finally and permanently solved. It is a continuing problem and is always most acute in major communities where the normal increase in population and riding habit is so rapid that it frequently taxes the ability of the community and its public utility companies to keep abreast of the demands of service.

There are in many instances local conditions which have, in the development of a community, produced constricted, over-populated areas which naturally become transportation terminals or common centers into which a large proportion of all the traffic of the community flows. Ultimately there is created within those areas an intensified congestion which strangles the movement of all classes of vehicular traffic almost to the point of complete stagnation.

The effect of retardation of the movement of street cars, or any scheduled transportation within those over-congested areas, extends to the entire service rendered. Irrespective of however good the service may be as a whole, its effectiveness is generally measured by inconveniences to the public experienced at points where the service is unavoidably at its worst and where, in order to relieve the situation, heroic measures in the way of producing additional facilities must be taken. Undeniably that is the situation which exists in the city of Chicago today in respect to its local transportation.

What is the problem here under discussion? It is first of all a transportation problem in the broadest sense of the word, and it involves co-ordinating all the various transportation facilities, that are susceptible of co-ordination, into a single operating unit so that each element of the whole may perform its function in the most efficient and economical manner, to the end that the riding public may be transported at the lowest cost and in the shortest possible time.

In the long run there is nothing but grief for the public and every one else with two or three competing transportation systems in the same city. The underlying principle of the most effective and economical operation of urban transportation is the establishment of a limited number of long-haul trunk lines served by numerous short-haul collecting and distributing lateral lines provided by a single transportation agency.

The most acute situation in Chicago's transportation problem, requiring attention at the earliest moment possible, is the overcongestion of roadways within the Loop or downtown business district. This Loop District situation seems to be looked upon by the public generally and by many newspaper writers as being the all-important feature of the traction problem in this city, believing that after relief of some kind becomes effective there the rest will be easy. As a matter of fact, this Loop District problem, although knotty and urgent, constitutes only a relatively small part of the whole problem, because, speaking with particular reference to the Chicago Surface Lines, that utility is serving many important and widely separated business and industrial centers, each of which, having distinctive features, constitutes a special element of the whole problem.

Suggestions for Relief

The immediate relief of the Loop District situation will be simple enough if all the interested factors can be brought to work in harmony and an earnest effort is made to do the things that are obviously necessary—namely:

1. Build subways for surface cars to be used for multiple-unit operation when practicable. Two such subways are needed from the west side of the city extending eastward under the Loop District to and under Grant Park.

2. Build north and south subways for surface car operation. If one subway were built in State Street, that part of it from some point well north of the river to a point south of Roosevelt Road should have four tracks, two of which might be assigned to elevated railroad train operation which would afford a much needed opportunity to develop greater use of outlying main-line track capacity. To meet the near future demand for service east of State Street, which is inevitable and will be due to the development of business in the area between State Street and the lake, there should be constructed, for surface car operation, a subway extending from some point south of Roosevelt Road in Indiana Avenue, Michigan Avenue and under Grant Park—connecting with the proposed east and west subways to terminate under Grant Park—and ultimately to be extended northward under the Chicago River and as far north of the river as conditions may demand.

3. Open more through north and south streets by extending Clark Street, La Salle Street and Franklin Street southward as contemplated by the new steam railroad terminal plan.

4. So far as it is practicable to do so, through route north and southbound surface cars.

The surface line subways should extend a considerable distance beyond the present congested business area so that surface cars could be operated through them at high speed, and all surface line riders, to whom the subway service would be available, be given the benefit of rapid movement and saving of time.

If these Loop District suggestions were carried out, the street congestion

*Abstract of paper presented before convocation of Western Society of Engineers, Chicago, Feb. 6 and 7, 1924.

in that district would be materially relieved and street car service would be greatly improved because through greater freedom of movement the available rush-hour capacity of the tracks would be more than doubled.

The most effective urban transportation in large communities may be produced through the development of a limited number of long-haul trunk lines served by numerous short-haul collecting and distributing lines. On the Chicago Surface Lines the universal transfer system in force operates automatically to produce such a trunk line and feeder line system, and if the natural surface trunk lines were provided with suitable facilities and traffic regulations in the congested districts of the city so that free movement of cars, operated where possible and desirable in multiple units, could be accomplished, a long step forward would be taken toward improving the speed, regularity, comfort and safety of street car service. Carrying out the logical ultimate of such a system involves the co-ordination with the surface lines of all present and future rapid transit elevated and subway lines.

MOTOR BUS CO-ORDINATION

The question of extending street railway service into new and undeveloped territory is ever present. There is always a demand upon the street railway companies to project their lines into sparsely populated territory, and reluctance on the part of the companies to build and operate those expensive structures in such localities until they can supply sufficient traffic to provide at least enough revenue approximately to meet bare operating expenses.

It is obvious that the basic transportation service in any community is and will be furnished upon rails. In the development of transportation in outlying, thinly populated districts, it is becoming recognized that the use of trackless service can be as effectively and more economically operated in supplementing the electric railway until sufficient traffic has been developed to warrant the building and operation of a permanent rail structure. A suitable motor bus operated by street railway companies for the development of transportation in new territory is a logical step in the direction of accomplishing the desired result, without incurring the burden of carrying non-productive expenditures of capital by the electric railway system. The use of such a co-ordinated bus system for development of traffic in outlying districts should be authorized and encouraged.

Various plans for improvement of Chicago's transportation system have been made and reports submitted by engineers and commissions. Two notable reports in recent years, both of which give a comprehensive view of the local problem, are the one presented in 1916 by the Chicago Traction and Subway Commission, and another prepared last year by Major R. F. Kelker, Jr., for the local transportation committee of the Chicago City Council.* Any complete study of the local problem should necessitate careful consideration of such reports.

In any transportation study of Chicago the territory served must be considered with relation to the following facts: (1) A central business district approximately 1 mile in diameter; (2) an inner residential district extending out about 5 miles; (3) an outer residential district extending from 5 to 10 miles from the center of the city.

There are also many important outlying industrial districts.

Business centers are widely distributed in Chicago and therefore the riding, during the rush hours, must also be heavy in many districts. While the Loop is commonly discussed as the place in most serious need of relief, yet the zones of heaviest street car loading on lines entering the Loop are more than a mile from the Loop District. On the north side, points of heaviest loading are between Division Street and North Avenue; on the west side between Halsted and Paulina Streets; and on the south side south of Eighteenth Street.

The cars from the entire southern district from Ashland Avenue to the Lake enter the Loop over three streets —Clark Street, State Street and Wabash Avenue. This brings a maximum of 116 cars per hour on Wabash Avenue, 142 cars on State Street and ninety cars on Clark Street; and yet it is a noteworthy fact that at a given point on Western Avenue approximately the same number of passengers are carried as at Van Buren and Clark Streets.

Similar comparisons might be made with other outside lines to indicate that the transportation problem for the Surface Lines is not by any means confined to the Loop District. The total number of passengers carried by surface cars within the Loop area is less than 500,000 per day, while the total carried by the system is over 4,000,000.

The ratio between passengers carried in the middle of the day period and in the heaviest rush period for the various lines forms an interesting comparison of the demand for service. The rush periods, morning and evening, are of short duration; most of the extra cars being of value for one trip only in relieving each rush period.

PASSENGERS PER FIFTEEN-MINUTE PERIOD

Line	Middle of the Day Period	Maximum Evening Rush Period	Ratio of Passengers
Chicago Avenue.	110	1,919	1 to 18
Grand Avenue.	90	1,400	1 to 15
Van Buren Street ..	100	1,200	1 to 12
Cicero Avenue.	95	2,447	1 to 25
Milwaukee Avenue.	250	3,600	1 to 14
Elston Avenue.	45	800	1 to 18
Combined Loop entrances..	1,280	7,195	1 to 5.6

These conditions, of course, could be materially helped by co-operation on the part of employers to the extent of staggering their opening and closing hours, thus reducing the peak demand and enabling the street railway company to serve the people more adequately at all hours of the day.

If, as has been suggested, all the west side cars were brought through the Loop to turn at points north or south of the Loop area, and all of the north side cars were taken through to points south of the Loop before turning, while all of the south side cars were taken through to points north of the Loop before turning, the results would be to increase the cars passing over the tracks between Lake and Kinzie Streets from 296 cars in a maximum hour to 777 cars. Those passing over the south side streets south of Van Buren Street would increase from 402 cars per maximum hour to 604 cars. The added cars would be empty in the extra section of travel and would congest the streets to an impossible condition.

Under present conditions, several sections of the city are very serious points of delay and congestion. Grade crossings at many points throughout the city are continuing to disrupt street railway service. These delays from railway crossings create operating conditions that are more serious than the delays due to other street congestion. This will, of course, be improved in time by elevation of steam road tracks. One of the causes for Loop congestion and for congestion along some outside thoroughfares, such as Halsted Street, is due to the very poor condition of the paving outside of the track, and on all north and south streets just west of the Loop area.

There is at present no easy way of getting around the Loop if one wishes to travel from north to south by automobile. If some good traffic routes could be provided on non-railway streets part of the downtown congestion would be immediately relieved.

A great deal of money has been spent in street widening for through boulevards in providing routes for pleasure driving, but relatively little has been done for providing routes for heavy traffic or for providing by-pass routes immediately around the Loop; and less has been done in adjusting street conditions to expedite the movement of street cars in congested areas.

A very valuable form of research to prove what kind of relief for downtown congestion would be provide the greatest comfort would be the investigation of the relative interference to traffic flow created by street cars, trucks, horse-drawn vehicles, pleasure cars and buses, in proportion to the number of passengers served. Such information as is now at hand would indicate that the present congestion is caused by a large number of vehicles, each serving a very few passengers, and that the street cars number 10 per cent of the total vehicles while handling 74 per cent of the people riding along the congested streets in the Loop District.

WHAT IS A BILLION?

"Millions" and "billions" are so easy to say and are used with such frequency in financial and industrial transactions that their real magnitude is not always appreciated. When attempting to get a vision of what the Surface Lines' yearly total rides of 1,461,000,000 really means consider this: Since the beginning of the Christian era old Father Time in ticking off the minutes from which the centuries have been built up has scored in 1,923 years a

*Both reports were published in the ELECTRIC RAILWAY JOURNAL at the time issued.

total of 1,011,420,000 minutes—450,000,000 less than the number of Surface Lines' riders transported in one year. For the purpose of accentuating the significance of Surface Lines' figures consider the fact that the Chicago post office prides itself on the handling of 1,298,000,000 pieces of first-class mail last year—an enormous task well done. In that same period the Surface Lines transported 1,461,000,000 riders.

The Illinois Bell Telephone Company reports that nearly 4,000,000 telephone connections are made daily in Chicago. The Surface Lines provided an average of 4,331,000 rides for each day.

At the present time the Surface Lines carry on an average week day 4,331,000 riders, of whom 2,421,000 are cash passengers, 1,786,000 transfer and 124,000 free passengers. The average haul on an individual line varies from 1.5 to 3.5 miles, but with the use of transfers needed to complete the journey of many passengers, the average ride exceeds 4 miles, which is said to be the longest average haul of any surface system in the world.

Taking the total number of revenue passengers on the surface, elevated and bus systems of Chicago last year and adding the transfer and free passengers carried by the Surface Lines, we find a grand total of 1,687,000,000 riders. This gives an average daily travel of 4,622,000 passengers, which might easily approximate 5,000,000 as an average for a week day. This is an enormous figure when it is considered that it excludes the great number of people handled by taxicabs in Chicago, as well as those brought into the city by interurban electric roads and suburban steam roads. The total number of riders carried by the Surface Lines in the last calender year was 1,461,000,000, which was by far the highest figure in the company's history. The number of separate routes operated by the Surface Lines is 114. The average number of cars now in operation week days is 3,250.

The magnitude of the local street railway system may be judged from the fact that its single-track mileage would form a trunk line from Chicago to Boston, and its daily car mileage would go around the globe sixteen times.

While the other two transportation agencies serving the Chicago district undoubtedly cover an important part of the field, it is interesting to note that for the past year the Surface Lines carried 86.6 per cent of the total passengers and 78.4 per cent of the revenue riders using these facilities. Since the Settlement Ordinances of 1907 were passed, the surface companies have extended the system to 268 miles of single track—an increase of nearly 34 per cent.

The universal transfer system on the Surface Lines is said to be the most extensive in the world, reaching the very high figure of 73 per cent of those paying fare. On all the surface lines a transfer is allowed at practically every intersection, which results in an exchange of passengers at 591 points.

There has been a surprising growth in the riding habit in Chicago during the past year. All local transportation agencies have felt this. On the surface lines alone revenue passengers increased more than 8 per cent—the revenue rides per capita having jumped from 268 to 285 in 1923—the highest in the history of the city. A combination of revenue rides on the surface lines and the elevated roads showed a riding habit of 356 as against a peak of 329 ten years ago.

Saving the Small Road*

By JOHN B. CRAWFORD
Superintendent Concord Electric Railways, Concord, N. H.

ELECTRIC railway lines throughout the country have been suffering and very ill for a long time. Many have given up the ghost and more are threatened. Even in New England the companies that have ceased to function and the miles of track abandoned are appalling. Are all destined to follow the example of their forbears, the stage coach, the canal boat and the horse car? It is predicted that in five years there will be no street cars, except in the larger cities like Boston, New York, Baltimore and Cleveland.

It is not the motor bus but the private automobile that is causing the loss of patronage to the street railways of New England. In the smaller cities, where the cost of living is lower, where nearly every family owns an auto, where people are more generally acquainted and invite their friends to ride and where the parking of cars has not assumed the importance it has in the large city, this competition is real and a question for serious thought.

As a feeder the motor bus has its place and a number of bus manufacturers realize this and are beginning to work with electric railways instead of against them. The public is slowly awakening to the fact that buses and jitneys must be regulated and that it is not a square deal to the street railways to let these pirates come along and skim the cream. When it comes to handling mass transportation safely and expeditiously the motor bus is inadequate, costly and cannot supplant the modern electric car. In such cities as Newark, Des Moines, Bridgeport and others where an attempt has been made to substitute buses for trolleys it has been shown conclusively that the electric car was the most useful method of surface transportation yet devised, and the populace voted to restore the trolleys because the bus proved inadequate and costly.

More Aggressive Publicity Needed

Do we not in many cases sit by and let our more aggressive competitors take away the cream of our business? In my view both steam and electric railways are weak in this respect. We don't advertise enough. The manufacturer and the merchant sell their product largely by advertising. We have transportation to sell, but do we use modern selling methods? For instance, in the interior rack space of our street cars we have one of the best advertising mediums in the world, but many of us do not make use of this space for the purpose of telling our story to the public. Instead we lease it by the year to an advertising company which sublets it to national advertisers who appreciate its value as an advertising medium.

In quite a number of cities the weekly pass has been tried out and has met with instant success. And why? Because of the value of the advertising and publicity campaign which preceded its introduction. I hold no brief for the weekly pass, but I wish the members of this club might hear Walter Jackson give a talk on this subject. It may be that the same amount of thought, preparation and money spent in getting more riders at our present fare would produce more revenue than the weekly pass, but the fact remains that it is being successfully used in thirty-five cities.

Why not get your board of directors to give you an advertising appropriation for 1924? Make it a part of your budget. Offer a prize locally for the best slogan. Get your patrons interested. Give them something to think about while waiting for a car other than that dry curve or that bad joint, and incidentally don't forget to grease that curve and also tell them why you do it. It will soothe their feelings and make friends for your company.

What the public wants is service, and it is generally willing to pay for it if it has a clear understanding of the cost of service. To illustrate this, several years ago we laid out a program of rehabilitation. First, we obtained an increase in fares; then we proceeded to rebuild all cars and trucks one at a time, replacing worn out and obsolete equipment as we went along. We sold our scrap and bought shop tools. Now our cars are kept painted and clean and our train sheets show they are on time nearly 90 per cent of the time. When we first introduced one-man cars we had a public upheaval and the writer came in for a lot of abuse and unfair criticism. However, as soon as the car rider began to realize this was propaganda, and to understand the need for safety cars, the trouble died down as quickly as it had started and for the past two years we have had surprisingly few complaints.

Good public relations are today about the most discussed feature of public service companies. Whenever utility managers meet they will be found discussing ways and means of improving public relations. Such ways and means have two objects in view: First, constantly better service, more courteously rendered; second, constant efforts to get the public to understand the problems as well as the proper functions of the company, and the physical and financial facts of the company's existence. Confidence in the public's sense of fair play and justice when it knows all the facts can be relied upon. As the car riders come to know and understand the facts of the electric railway business, they cease to respond to the demagogue, and also to lose that instinctive antagonism which all of us

*Abstract of a paper before the New England Street Railway Club, Boston, Feb. 7, 1924.

have for the things we do not understand.

The Boston Elevated Railway has adopted a new plan to secure the good will of the public, namely, the movie film—a wise move. Perhaps that progressive organization will before long establish a central broadcasting station in order that waiting throngs of passengers may be kept cheerful by being advised by radio of unexpected delays.

Consider the case of the small company whose property is slowly going into the discard for want of patronage and credit. In most cases the discontinuance of such service is not only a great loss to the bond and stockholders, but nearly every person in the community is affected. If an operation is needed why not face the facts and call in the surgeon before it is too late. A drastic reorganization has been the means of restoring a good many steam railroads in the past decade. If our trolley roads need help to continue service, let's go to it. Work out a real constructive plan. Arouse public interest. Appoint a small committee of bondholders, one of stockholders, one of car riders and a committee of employees. Get the chamber of commerce interested and also city officials.

Enlist Aid of Local Chamber of Commerce

Charles M. Bassett in a recent publication, "The Assets of an Ideal City," says: "No institution serves to efficiently in crystallizing public opinion in civic affairs as the modern well-organized chamber of commerce. Its program is based upon a consideration of public needs by a selective group of citizens who are voluntarily associated in the interest of civic progress. This group represents the best thought of the community, those who have ideals and are ready to give their time and money to bring about their realizations."

Here is the meat of the cocoanut. To crystallize public opinion in your favor is what you are trying to bring about, so don't forget your chamber of commerce. When we needed an increase of fare from 6 to 8 cents a few years ago we arranged for a meeting of our chamber of commerce. We laid our cards on the table and told them our troubles. At first opposition arose and many questions were asked, but when the meeting was over we had the good will and active co-operation of a large majority of the members present.

Above all, don't forget to include a committee from the central labor union. This body represents, in a large measure, the views of the car rider, and I have always found its members ready and willing to co-operate and help us when called upon. Having now prepared the ground, the next step is to get all these committees together and functioning.

Some of you may be saying, "It can't be done," "As far apart as the poles," "Too many factions," and so on. Just remember that each of these groups has a personal interest in the plan you are to present. Perhaps the bondholder will agree to scale down his bond or forego interest until earnings can be restored. Perhaps the stockholder will consent to an assessment for the purchase of some new equipment. Even the public in the communities served may be willing to buy some new stock on the installment plan for the purpose of repairing the track, rather than lose the welcome sound of that old flat wheel. In the Middle West "customer ownership" has been the keynote of the financial strength of the public utilities.

The best place to present your plan is in the dining room of your local hotel after a good dinner. Everyone is now in the proper frame of mind to sit back and listen in all fairness to your proposals, and if outlined by someone with a Matt Brush punch and a few good stories your committee is likely to become filled with enthusiasm and you may be agreeably surprised at the results accomplished.

There is no general panacea for properties that are in a bad way, with earnings constantly decreasing, but it does seem that a number of such lines have been abandoned and the franchises given up without making a last stand. If we don't wait too long some new money may be secured that will enable us to produce gratifying economies.

The growth of our country during the past twenty years has been due in a large measure to the electric railway and it is most important that this valuable industry be maintained and made self-sustaining. In many cases this can be done only by more liberal patronage, and a general campaign to increase this patronage should be planned and carried out during 1924.

Pedestrian Subways with Narrower Surface Sidewalks Would Speed Traffic*

By T. L. Condron and C. L. Post
The Condron Company, Engineers, Chicago, Ill.

AT PRESENT the great sources of street congestion that can be relieved are the stopping of vehicles along the curb lines to load and unload and the confusion at the street intersections caused by pedestrians crossing the traffic lines. The stopping of vehicles along the curb, even though for brief intervals, immediately interrupts a possible lane of traffic and reduces the traffic width of the thoroughfare. In general, the width of the downtown streets in Chicago is such that there is space for two lines of street cars and four lines of other vehicles. When the latter stop alongside the curbs, as is the normal situation, the number of lines of moving vehicles becomes two instead of four. Consequently, if there is a way to afford additional space in which vehicles may stop to load and unload, the number of lines of moving vehicles can be increased to four. This desirable result can be attained by reducing the width of surface sidewalks and building subways for pedestrians.

Room for such sidewalk subways is already in existence in the downtown district on many streets, as the space beneath the surface sidewalks is utilized in connection with the abutting buildings. The streets have been dedicated to the public for highway purposes, and, therefore, the space beneath the sidewalks is at all times available for the use of the public, although in general revocable permission has been granted to the abutting property owners to use this sub-sidewalk space as extensions to their basements.

The block bounded by Jackson Boulevard, Van Buren Street, Dearborn Street and State Street has been selected as an example involving all the different conditions affecting the downtown streets. Supports for the elevated railway obstruct the sidewalk lines of Van Buren Street, street car tracks occupy State Street and Dearborn Street, while Jackson Boulevard is free from surface cars as well as elevated structures, and Plymouth Court is a non-continuous street. The surface sidewalks on the streets surrounding this block would be narrowed by setting back the curbs 7 ft. on each side, thus reducing the width of the sidewalks from approximately 15 ft. to 8 ft., except at street intersections, and giving room for vehicles to stop alongside of the curbs without interfering with the main traffic lines. This would increase the capacity of the streets for moving vehicles other than street cars 100 per cent. At the corners stairways would be provided leading to the sidewalk subways. Stairways might also be built from the subways to the loading zones for street cars.

The use of the surface sidewalks along each block would be restricted to those passing along that block to enter or leave the adjacent buildings, and for movements of pedestrians and packages from standing vehicles to the buildings. Pedestrians would not cross the street intersections at the ground level, but only in the subways and not be interfered with by vehicular traffic. The sidewalks in these subways would have practically the same width as the present surface sidewalks, thereby actually increasing the sidewalk capacity at least 50 per cent.

The principal feature of new construction involved would be the building of sections of this subway at the street intersections, and as these portions of the subway would have the same width as the subways under the sidewalks, the construction would be simple and relatively inexpensive. They would in no way interfere with any future traffic subways, as the traffic subways would of necessity be at a lower level at the street intersections, and such traffic subways would not be wider than the distance between the present curb lines except at the stations, which would readily be reached from the proposed sidewalk subways.

The sidewalk subways would be raised at intersections with general utilities such as sewers, water and gas mains, and electric conduits, in order to involve the minimum of interference, especially with the sewers, which of necessity are at considerable depth below the street level and should be maintained at or near their present depths.

*Abstract of a paper presented before annual convocation Western Society of Engineers, Chicago, Feb. 6 and 7.

Maintenance of Equipment

Portable Stand Lamp for Car Repairs

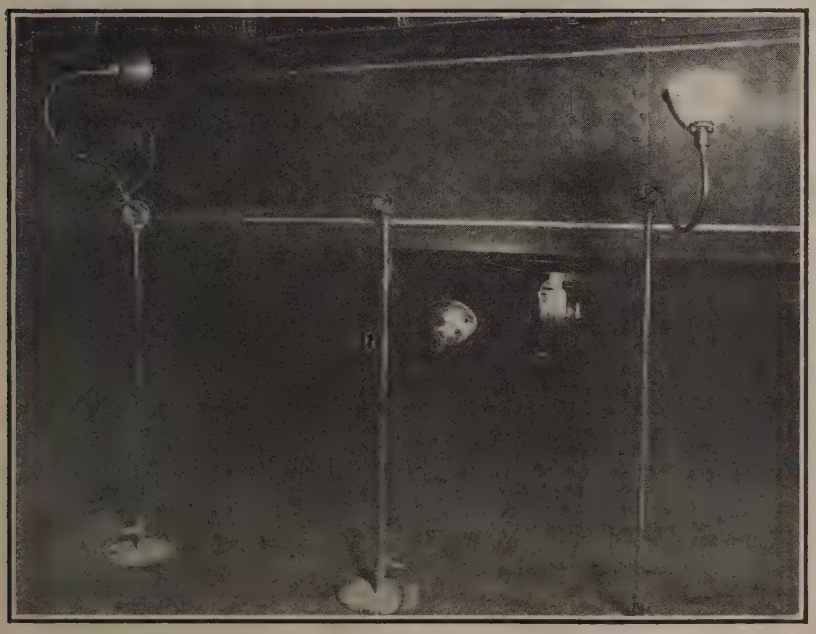
By P. V. C. See
Superintendent of Equipment, Northern Ohio Traction & Light Company, Akron.

A HOME-MADE type of adjustable lamp stand that has been found very useful for all kinds of work in the shops of the Northern Ohio Traction & Light Company is shown in the accompanying illustration.

In the position at the right the light may be used in connection with the painting of car ceilings or any overhead work. In the center position light is thrown on the work, either at benches or on trucks, while in the position at the left it is thrown on the side of the car for any carpenter body work that requires attention.

This device is made with a base casting somewhat resembling an ordinary traffic signal stand, threaded for 1-in. pipe. At a distance of 4 ft. from the ground, a round condulet box is screwed on the end of the pipe. A curved piece of pipe is fitted into another round condulet, the two being fastened back to back by a screw with a wing nut. The wires are run through the pipe and into a socket to which a reflector is fastened, thus making a neat finished job.

Lamps of this type are found much more convenient than the usual form of drop light.



This Portable Lamp Stand Is Adjustable for a Wide Range of Work

Line Car Built to Carry Long Poles

THE Valley Railways, Lemoyne, Pa., has recently completed the rebuilding of a line car. This car was built in 1908 and was equipped for two-motor operation. In December, 1923, it was remodeled for four-motor operation and airbrake equipment was installed.

An interesting feature of the car is an arrangement of openings in the dashboards, to permit long poles carried on the floor of the car to project at both ends. The openings are 24 in. square and underneath a roller has been constructed by means of simple brackets and iron pipe. The pole is rolled into position on this roller and carried by the car to wherever it is needed and then easily rolled off again. The car itself is 35 ft. long and carries 50-ft. poles without difficulty. On account of the fact that much of the line of the Valley Railways is on private right of way this method of carrying poles has been a great convenience.

Hole in Line Car Dash Permits of Carrying Pole

Feeder Wires Reinsulated at Small Cost

AN EXPERIMENT recently made by the Union Street Railway, New Bedford, Mass., with the use of rubber tape to reinsulate feeder wires has proved so successful that it is planned to extend the practice. Three feeder cables, one of 500,000 circ.mil and two of 300,000 circ.mil, which had been installed about twenty years ago had become almost bare of insulation in places. This was a rather dangerous condition because the feeders were carried on iron poles with iron cross arms.

It was found upon investigation that the copper in these feeders was as good as ever and on account of the high price of wire the railway wished to avoid buying entirely new cables. The old wires therefore were recovered with one layer of 2-in. rubber tape and two layers of 2-in. cotton tape. This was done during the summer months and the heat of the sun soon melted the wrappings into a homogeneous mass.

The job was done by the line crew during spare time and it is estimated by the company that the cost of reinsulating the old feeders was less than 10 per cent of what new feeders would have cost. It is felt that they are now in almost as good condition as when they were new.

Simple Wheel Stops Are Effective

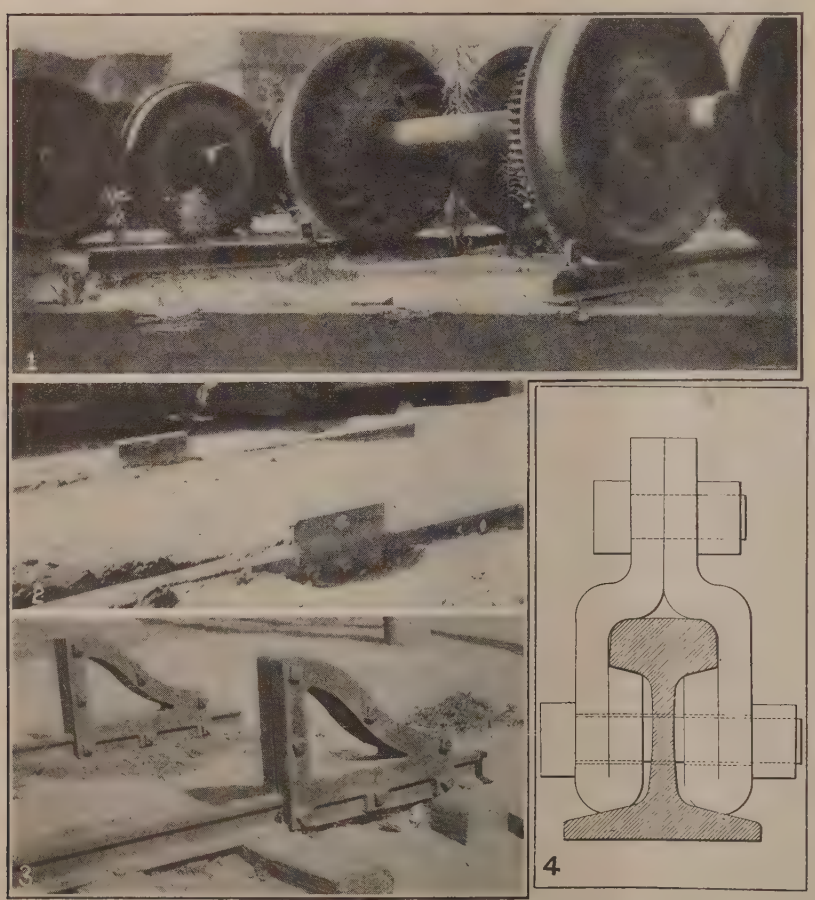
THE Pacific Electric Railway, Los Angeles, has standardized in three classes of wheel stops. The simplest type is for wheel storage tracks at the company's shops. For this purpose a bumper made of two cast-iron plates bolted together above the rail has proved satisfactory. The stop extends about 5 in. above the head of the rail, and since it is not bolted through the web it may easily be adjusted and fastened in any desired location.

In yards where passenger cars are stored at the various terminals, a slightly larger wheel stop is used. This consists of two plates fastened together above the rail with a single bolt and through the web of the rail with three bolts, as shown in the accompanying illustration and sketch No. 4.

A still larger wheel stop has been adopted for use on industrial spurs and public team tracks. Two iron castings, each roughly triangular in shape and weighing about 70 lb., are bolted together with one side of the triangle vertical and one side along the rail.

The length along the rail is 27 in., and the height is 19¾ in. Including the time spent in drilling the rail and adjusting the location of the castings, it requires two laborers a full nine-hour working day to install a set of these bumpers in position.

All of these wheel stops possess the advantages that they are very inexpensive to install, occupy a minimum of space in the storage yard, and serve their intended purpose satisfactorily.



Simple Wheel Stops Used by the Pacific Electric Railway

No. 1. Adjustable clamp for wheel storage tracks. No. 2. A larger clamp is used in pasenger terminal yards. No. 3. This bumper is useful on industrial spur track. No. 4. Three bolts pass through the web of the rail and one bolt holds the upper parts of the two steel plates firmly together.

Carriage for Moving Armatures

ON PROPERTIES where the armatures are removed from the motors in the carhouse, and must be transported to the shop armature room for repairs, a carriage of simple construction, such as is used by the Chicago & Joliet Electric Railway, is convenient. In this device a frame is mounted on an axle between two wooden carriage wheels of 4 ft. diameter set to 24-in. gage. The principal member of the frame is a steel bar 5 ft. long, of ½-in. x 1½-in. section, fastened directly to the axle and braced by diagonal members. One end of the bar is bent up to form a handle for moving the carriage. The other projects about 6 in. beyond the axle. From this a yoke bar is carried by a permanently fastened 3-in. link of 1½-in. x ½-in. material, which supports the yoke at its center below the axle, so that the yoke is free to swing vertically about the point of support. A second link on the opposite side of the axle with a removable pin also connects the yoke to the main bar above. This prevents the armature from swinging while the carriage is being moved. This link can be disconnected and the yoke dropped for picking up an armature. Two hooks held in position by removable pins are mounted on the yoke for engaging an armature shaft. Adjustment for various lengths of armatures is made possible by a number of holes in the yoke.

This Narrow-Gage High-Wheeled Armature Carriage Is Used in Shops at Joliet

In operation, the carriage is tilted up so as to engage one end of an armature shaft with the forward hook; then, after removing the pin in the rear link, the other end of the shaft is engaged with the second hook.

The handle of the carriage is then lowered to a point where the pin may again be inserted in the link. Lifting the handle raises the armature free from the ground. The narrow gage and the large wheels are employed in order that the carriage may be moved easily between the cars as they are berthed in the carhouse.

The News of the Industry

Akron's Mayor Loses

Still Says City Shall Ride on Rubber, but Council Votes Down Bus Operating Grant

Mayor D. C. Rybolt of Akron, on Feb. 19, had his first real defeat since electric railway service was discontinued on Feb. 1, for the Council refused, by one vote, to pass the pending bus franchise as an emergency measure. Eight votes were required. The franchise received only seven.

Not only this, but following the efforts of the Mayor to foist upon the city a ten-year bus franchise embodying practically the same provisions as the emergency measure, the Council in special session on the afternoon of Feb. 20 killed the proposal. The action followed an address by Councilman E. L. Martin, who tore the legislation to pieces and drove the administration to abandon the franchise. Hundreds filled the Council chamber and cheered the speaker. A plea by Councilman Rose for the return of the street cars won applause from the gallery.

Buses Operate With Difficulty

The bus franchise that was proposed is a broad one, providing fares ranging from 5 to 10 cents. For a single ride without transfer privilege there was to be a straight fare of 5 cents. By purchasing tickets at the rate of five for 30 cents, the rider could obtain a free transfer. In addition, "Limited" buses are provided from one section of the city to another at a 10-cent fare, with free transfer. And a 5-cent fare patron on a local bus was to have the privilege of transferring to a limited bus by paying another nickel.

The franchise—or rather franchises, for there were two, one a temporary and the other a permanent franchise—provided that the Akron Transportation Company, a newly organized bus company of which little is known regarding its real backers, should invest not less than $100,000 in "modern motor buses" and that it should be "unencumbered," but in case it was not "unencumbered" the company should file a liability insurance policy for $100,000 "to protect the interests of the public." The streets upon which the company was to operate were named. These streets included thoroughfares upon which independent motor buses and jitneys have been operating for years. Under the temporary franchise, which it was intended should be in effect until May 1, 1924, the present operators were given until the close of the present year to retire from the field, but could continue for a short period longer at the option of the Mayor.

While the permanent franchise was to run for ten years, there was to be a fare adjustment at the end of the first year, by arbitration, if necessary and at the end of each two-year period thereafter in a like manner. The third arbitrator was to be named by the probate judge of Summit County in case a company arbitrator and a city arbitrator could not agree.

When the members of the Council were presented copies of the franchise on Tuesday afternoon, and an effort made to "railroad" the grant through, four members entered vigorous protest. They pointed out that an attempt was being made to "rubberize" Akron by "ramming a franchise down the throats of the people for a 10-cent fare." The Mayor made a long plea for the passage of the franchise, urging immediate action so that "motorization of the city may become real." He admitted that the present service and equipment were wholly inadequate to care for the people, but insisted that if the franchise was granted it would result in Akron securing "the finest transportation system in the world within a short time." The Mayor refused to say who was behind the new bus company, asserting that the "men were responsible." Councilman Rose said he had been given to understand that Mr. Firestone and others were behind the project. During the last ten days Mr. Firestone has said repeatedly that he "would have nothing to do with the financing of a bus company." Another meeting of the Council was called for Wednesday afternoon. It was at this meeting, as previously related, that the proposed grant was defeated.

Relief Being Sought

Transportation in Akron during the week commencing Feb. 16 has been worse than at any time since the street cars ceased running. Wednesday night, following a sleet storm during the afternoon, the situation was particularly bad and the seventy-two buses which have been brought from the outside were wholly inadequate to care for the crowds. Councilman Rose declared it took more than an hour to get the workers away from the Goodyear plant and that thousands walked. Similar conditions prevailed at the other rubber plants with the exception of the Firestone, where more than thirty buses were sent to care for the workers.

Many persons are still appealing to the city for relief, but the Mayor announces that "the inconveniences now suffered will be more than offset by the service that will be supplied later." "Akron must, and shall," he declares, "ride on rubber."

Business conditions are still bad. Merchants openly complain that women shoppers are not coming downtown. The usual sales for February have been abandoned.

Home Rule Hearing Set

Discussion of Measure to Help New York City Administration Will Include Referendum Rights

The final public hearing, before introduction in the Legislature, on the home rule enabling act will be held in the city of New York, at the City Hall, on Feb. 25. The hearing held at Albany on Jan. 30 brought forth a request for a more specific enumeration in the enabling act of just what the local legislative body of a city might do and what it might not do under the provisions of the home rule amendment to the Constitution approved by the people last November, and also a clear statement of the class and kind of questions which must be submitted to the people for their approval by the board of aldermen or local legislative body.

The first draft of the enabling act gave certain regulatory powers to cities over public service corporations and implied that a city having the right under its charter or by existing law to own and operate a public utility might do so and might create a debt of the city for such purpose without referendum to the people.

Popular Referendum Provided

In the revised draft this same authority remains, but under a new section fifteen added to the enabling act on "Mandatory Referendums," it is provided that any local law which changes a provision of law relating to public utility franchises must be submitted to the people for approval by them.

Subdivision five of Sec. 12 of the enabling act, under supplemental powers of cities, reads:

"5. To adopt a local law repealing a local law or state statute, which, pursuant to this chapter, it is authorized to adopt or amend."

This language appears to afford an avenue through which the question of jurisdiction of regulation of public utilities by the State, through the Public Service Commission, and by the various cities, each after its own manner and method by means of local ordinance, might become very much mixed. Aside from this the mandatory submission of ordinances changing a local franchise condition of a public utility corporation to a referendum of the people threatens to make such bodies the football of local politics, commentators say.

Injunction Secured Against Dayton's One-Man Car Order

Protected by a temporary injunction which prohibits the city from ordering them off the streets, one-man street cars still are operating in Dayton, Ohio. Four companies have entered the fight to keep the one-man cars in operation. Arguments on the case will be heard in the near future. Meanwhile the one-man cars will be permitted to continue. The cars were ordered off the streets by a referendum of Dayton voters last fall after protest had been made against them. The ordinance passed by the City Commission in conformity with the referendum was to have become effective on Jan. 1.

Members of the local street railway men's union at Springfield, Ohio, in a letter to Mayor William Argabright are protesting the adoption by the City Commission there of any measure providing for the use of one-man cars. The men protested the adoption of the one-man car on the theory that it is difficult to operate them and that they constitute a menace to the public.

Resolution to Abrogate Phoenix Franchise Tabled

In deference to the opinion expressed by the spokesmen for several city organizations the City Commission of Phoenix, Ariz., has tabled its resolution directing the city attorney to take steps to abrogate the franchise of the Phoenix Railway for alleged failure to comply with the terms of the franchise. Mayor Whitney voiced the sentiments of the Commission as being in favor of procuring an engineer to examine the situation and report as to the best means of rehabilitating the system, this report to be digested by the city officials and a committee of citizens named from the various civic organizations from which it is hoped some definite plan for improving the railway situation may be worked out.

Some time ago a committee of citizens appointed by the Mayor to investigate the matter recommended municipal ownership with private operation.

The whole matter arose over the question of paving. The company contends that it has no money to do this work. S. H. Mitchell, manager, says that the system is not paying and has in fact never paid any dividends to its owners. The company operates at a 5-cent fare.

New York City Administration Measure Appears in Legislature

A second Democratic transit bill was introduced in the New York State Legislature on Feb. 20 by Senator Walker and Assemblyman Bloch, administration leaders in their respective houses. It gives cities the right to own, establish, construct, acquire and operate municipal bus and trackless trolley lines at a statutory 5-cent fare. The new measure follows the terms and provisions of the "city home rule transit" bill introduced on Feb. 19, the second piece of Hylan legislation. The Democrats introduced the bill chiefly to take care of the existing bus and trackless trolley lines to the best advantage from the Hylan municipal ownership standpoint. The city home rule transportation bill, the bus bill and any other transit measures that may be introduced by the Democrats are expected to pass the Senate. When they reach the Assembly, however, it seems likely they will be referred to a committee, where they will stay until a compromise is reached.

Detroit's Articulated Unit in Service

Detroit's three-unit articulated train arrived in that city on Wednesday night. It had been run on its own power overland from Cincinnati and carried sixty railway men interested in its operation.

On the trip it encountered rain, sleet and snow. The test to which it was put was very severe, but the vestibules proved to be weathertight. The riding qualities of the unit were excellent. It took perfectly the severe breaks in grade and the curves. There were no mishaps. The train was put into service in Detroit on Thursday morning.

Franchise in Niagara Falls, Ont., Approved

After hearings covering a period of almost three weeks, the City Council of Niagara Falls, Ont., has approved the franchise to be granted the Canadian National Railways, the Canadian government-owned system, for the operation of local lines in Niagara Falls, Ont.

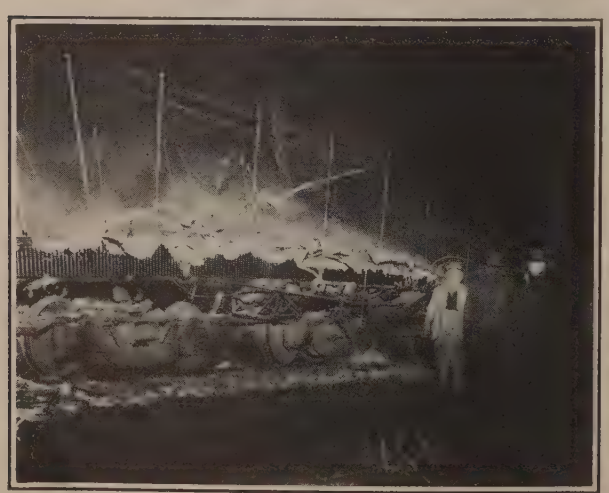
The only point over which there had been a prolonged debate was the exemption from local taxation asked by the Canadian National Railways. It was agreed that the company would pay a fixed rate of $20,000 annually for fifteen years, the period of the franchise. The franchise now must go before the Provincial Legislature of Ontario and also must be ratified by a vote of the taxpayers. The special election to vote on the matter will be held late in March.

It was agreed that the Canadian National should charge an initial fare of 7 cents. All future rates of fare will be based upon the service-at-cost provision in the franchise. The City Council wanted a 6-cent fare at the start.

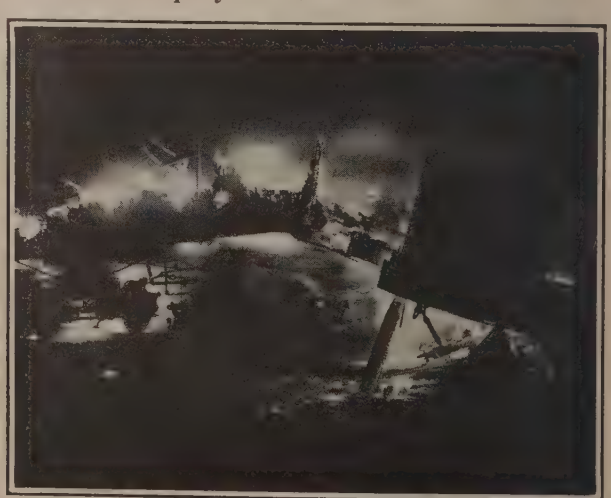
Arbitration in Des Moines

Failure to reach an agreement between the officials of the Des Moines City Railway, Des Moines, Iowa, and its trainmen over the question of the men's demand for an increase in wage scales and working conditions has resulted in each party to the controversy appointing arbiters to settle the disagreement. During the past week the company announced that W. C. Harbach would represent it in the arbitration proceedings and the men named Rev. F. W. Mutchler. Mr. Harbach has been a prominent manufacturer and capitalist in Des Moines for many years. Rev. Mutchler is at present pastor of Union Park Church of Christ in Des Moines. They will name the third arbiter shortly. In the past it has been the custom of the company to name its attorney, while the men chose their business agent.

Unfortunate Wreck on Indiana Union Traction Company's Line on Feb. 2



Flashlight of Anderson-Bound Car, Showing Car Destroyed Except for Trucks



Time Exposure Taken by Light from Burning Indianapolis-Bound Car

Operation Under Loss Not Compulsory

A railroad corporation cannot be compelled to continue operations at a loss under a permissive charter and cannot be prevented from selling its tracks and other physical assets as salvage, the United States Supreme Court held Feb. 18 in sustaining the ruling of the lower courts in the suit of the State of Texas against the Eastern Texas Railroad Company, a steam property. The company, operating a short line built primarily to serve lumber mills, gave notice of suspension and of intention to abandon its line and sell its assets when revenue fell off heavily due to closing of the mills because of exhaustion of the timber supply, nearly all of its traffic being lumber. Permission was granted by the Interstate Commerce Commission. The State of Texas resisted, the line being wholly intrastate.

Tentative Stockton Franchise Expected to Be Ready Soon

Progress is reported in the preparation of the blanket franchise application to be submitted to the City Council by the Stockton Electric Railway, Stockton, Cal.

Frank W. Webster, general manager of the company, has submitted a tentative draft to the legal department of the company and this document is in course of preparation for final submission.

The situation in Stockton is said to be similar to that with which Fresno was confronted until recently. Fresno has granted the Fresno Traction Company a blanket franchise covering a long term and under this franchise several extensions have been made. Stockton residents have urged extensions, but these have been declared impossible under the existing franchises.

The Stockton Electric Railway now holds several franchises, each expiring at different times, the longest term expiring seventeen years hence. The company hopes to secure a blanket franchise covering all its lines for a uniform period.

The railway systems in both Fresno and Stockton are controlled by the same interests.

Hearing on Philadelphia Subway Proposals on Feb. 29

The Public Service Commission of Pennsylvania has fixed Feb. 29 for the hearings on the petitions of the city of Philadelphia for certificates of public convenience for the proposed high-speed lines under step No. 1 of the transit plans. The system with which the hearing will concern itself will consist of subways under Broad Street, Ridge Avenue, Walnut Street, Chestnut and Forty-second Street; and elevated railway from Forty-second Street to the City Line on Woodland Avenue, and a bridge over the Schuylkill River to connect with the Chestnut-Walnut Street subway. There will also be considered the surface car subway on Chestnut Street between the two rivers and to Franklin Square by way of Sixth or Seventh Street, which the Philadelphia Rapid Transit Company interests require the city to build.

International Employees' Trial Postponed

The trial of other striking platform employees of the International Railway, Buffalo, and local officials of the Amalgamated Association on charges of conspiracy in connection with the dynamiting of the Buffalo-Niagara Falls high-speed line at Ellwood Station in August, 1922, when more than sixty tourists were injured, has been postponed by United States District Attorney William J. Donovan until after the United States Circuit Court of Appeals hands down its decision on the appeal of the four strikers who already have been convicted and sentenced in Federal court.

It may take at least three months for the United States Circuit Court of Appeals to pass upon the appeal of Francis Reilley, Healey Breeze, William H. Smith and William L. Vandell. Writs of error were obtained by counsel for the prisoners so an appeal could be taken. Maximum sentences under the law for conspiracy were imposed on these strikers.

Another Boston Subway Station Suggested

It is proposed to build one more station in the Boston subway system, at a cost of about $600,000. This is to be located in the Cambridge tunnel at the point where it passes Charles Street, which is a populous center of the West End, close to the Massachusetts General Hospital and other institutions. It is generally agreed that this section has not been adequately connected with the Boston rapid transit system. The proposition is now before the Massachusetts Legislature. The trustees of the Boston Elevated want the $20,000 to $30,000 a year cost of operating the station assessed against taxpayers.

News Notes

United Railways Pays by Check.—The pay car of the United Railways, St. Louis, has been sidetracked. In the future employees of the company will be paid by check instead of in cash. It is said that the new plan lightens the work of the paymaster's department. In addition it removes the hazard always inherent in the transportation of considerable sums of money.

No Construction While in Receiver's Hands.—Although there may be great need for extension of various branches of the United Railways, St. Louis, due to the increase in the city's population, Judge Faris of the United States Court for the Eastern District of Missouri has held that the court has no authority to order the construction of extensions while the system is in the hands of a receiver appointed by the court. This ruling, an oral one, was handed down by Judge Faris in passing on the application of the city of St. Louis, the North St. Louis Business Men's Association and the Natural Bridge Industrial District Association for leave to intervene in the United Railways litigation and ask the court to order construction of the needed construction.

Agreement Reached.—The Tiffin & Fostoria Railway has accepted the offer of the city of Tiffin, Ohio, which provides that the company remove its tracks from Washington Street and relinquish its franchise rights on the street. In return the company is to be freed of all paving costs.

Veterans in Dallas Honored.—Fifty-four veteran employees of the Dallas, Tex. Railway were honor guests at the Chamber of Commerce honor banquet to the "twenty-year men" in Dallas. This banquet given by the Dallas Chamber of Commerce was planned to honor those employees in Dallas who had remained in the service of one company for twenty years or longer, and several hundred veteran employees of various commercial enterprises, business houses, etc., were guests at this banquet. The Dallas Railway led the list of employers having the greatest number of twenty-year men to attend the banquet. D. L. Wilson, now retired on a pension, topped the list with a continuous record of service dating from April 29, 1887. Before going to the banquet the veterans posed for a group picture. At the banquet, held at the Oriental Hotel, Joe Cook, a veteran operator from the days of the mule cars in Dallas, wore clothes typical of the mule-car days, and around his neck was looped a big black snake whip, such as drivers of the old mule cars used.

Attorney Chosen.—The Tennessee Railroad & Public Utilities Commission recently named Horace B. Stout as its permanent attorney to succeed Roberts & Copper. The latter firm is retained in an advisory capacity.

Women's Committee Formed. — A women's committee on public utility information has been organized in Wisconsin to assist companies in forming its women into study classes and in providing general lectures dealing with the problems of the utility business. In addition the committee will suggest general plans whereby the women can make themselves more useful in connection with the efforts of the companies to provide courteous and efficient service to the public. The work of the committee will be carried on under the auspices of the Wisconsin Utilities Association.

Very Active in 1923.—In the year 1923 the Ontario Safety League distributed among manufacturers, motorists, railway men and other groups seeking co-operation in the reduction of accidents, 66,600 industrial bulletins, 225,000 motorists' cards and many circulars, reports, calendars and safety buttons, all in the interest of safety first. In addition the league distributed a little more than $600 in cash prizes in cartoon and essay contests.

Foreign News

Holland Uses One-Man Cars

During the past year several cities in Holland have adopted the one-man system on all or some of their cars. Arnhem included all its lines in the system and Utrecht began with one of its lines. Amsterdam has two lines with one-man cars. The object in each case was to economize.

In Amsterdam the result has been sufficiently satisfactory to cause preparations for the extension of the system. This will be effected by gradually changing the cars now in use, at an average cost of 115,000 francs ($2,000) per car. Experience with the one-man system in Amsterdam indicates that the saving in labor costs will more than pay for changing the cars. The payment of the personnel is 80 per cent of the maintenance and operation cost.

So far as one-man cars have already been substituted for two-men cars, no reduction in the number of passengers is reported. In fact, there is apparently an increase, though probably due to the public curiosity. Entrance is at the front and departure at the back of the car—the latter through a turnstile to prevent crowding and pushing against the door. A distinct improvement is that the doors are opened and closed only when the cars are standing, thus avoiding the many accidents, sometimes fatal, caused by people jumping on or off the two-man cars while they are in motion. In one respect the new cars are sometimes inconvenient, as no change is given by the driver-conductor and the exact fare (10 Dutch cents, 4 American) must be produced in a silver coin before a passenger is admitted.

It is hoped that the economy effected by the one-man plan will restore the street car system to its former profit-earning condition. There was a loss equivalent to about $30,000 in the year 1922, caused by reducing the fare from 15 to 10 Dutch cents (6 to 4 American).

Trackless Trolley Versus Tramway

The comparative costs of reconstructing the tramway tracks in that city and of substituting the trackless trolley are given in a report by R. H. Wilkinson, general manager Bradford Corporation Tramways. Mr. Wilkinson favors the change on certain routes, because of present high cost of reconstruction of wornout track. He, however, refers to the liability of buses skidding on steep gradients, and says that experience alone can convince him that railless vehicles can be as safely worked in such places as tramway cars.

The expenditure for converting the Bradford tramways to the trackless system would be about £603,000. This comprises return feeders for 51 route-miles, £128,000; overhead line for same distance, £93,000; reinstatement of roads, £382,000. Nothing is included for cars. The cost would be spread over fifteen years. If tramways are continued the cost of maintaining and renewing the permanent way would be £70,000 a year, or £1,050,000 in fifteen years. Against this, on the railless side, an annual tax would have to be paid for road maintenance amounting to £70 per vehicle, which for 270 buses amounts to £18,900. On this heading there would thus be an annual saving of £51,100.

No comparison was given of the costs of operation with the two systems.

Trolley Cars on the Vienna Stadtbahn

The Vienna Municipal Tramways will equip with trolley wires the Stadt and Ring Bahn of that city and operate it with trolley cars. This line forms two belts around the city and was originally part of the government steam railroad line, but owing to the high cost of fuel its service was abandoned following the war. The length to be equipped is 16½ miles, with twenty-five stations. As the formerly used steam railroad cars were 3 m. wide and the street cars only 2.2 m. wide, the station platforms will have to be extended and they will be raised in height at the same time to be flush with the car entrances. The standard type of surface motor car with one or two trailers will be used. The overhead line will be of catenary construction at 600 volts, but insulated for a possible increase in voltage later to 2,000 volts. Five substations equipped with mercury arc electrifiers will be built to supply direct current.

Automatic Substation in London.—One of the first automatic substations in England is being installed by the London Electric Railway for the extension of the Charing Cross & Hampstead line from Golder's Green to Edgware, now under construction. This station, located at a point called Burnt Oak, will have two 1,200-kw. transformers and synchronous converters for changing the incoming 11,000-volt three-phase current from the Chelsea power house to 600-volt direct current for the conductor rails. The converters will be started or stopped by a switch at the Golder's Green depot, some 3 miles away, and there also will be the instruments showing the load on each section of line fed from the substation.

American Locomotives Arrive at Bordeaux.—The French press has hailed with enthusiasm the arrival at Bordeaux of the first of the gearless electric locomotives built at Schenectady by the General Electric Company for the Paris-Orleans Railway. The trials held at Erie, which gave a high speed of something like 170 km. an hour, have made a most optimistic impression as to the possibilities of improving the service on this one of the most important of the seven great French trunk lines. The first trials in France will be over a portion of the line with but 600 volts on the contact line. The final trials will be held between Paris and Vierzon, where the line carries 1,500 volts. It is stated that if the model is adopted others will be constructed in France by the consortium of firms which makes up the Société d'Études pour l'Electrification des Chemins de Fer Français.

End of the Glasgow Subway Company.—The directors of the Glasgow Subway Railway have issued their final statement of accounts as of Aug. 1, 1923. On that date, as previously reported, the undertaking passed by purchase into the hands of Glasgow Town Council. With the exception of the secretary, all the staff have been taken over by the Council, and the directors propose to pay the secretary £3,500 as compensation for loss of office. The company's assets permit of a payment to the preference shareholders of 16s. 1d. per share and to the ordinary shareholders of 10s. 8d. per share.

Tickets Reduce Revenue.—It was intimated at a recent meeting of the Halifax, England, tramways committee that by the use of books of fourteen penny tickets for 1s. about £70 a week was being lost. When the concession was made last October it was hoped that it would lead to increased travel. A large number of books had been sold, but these apparently had been purchased by regular users of the cars.

Tram and Bus Insurance Rates Discussed.—At a town meeting to consider the promotion of a Parliamentary bill by the town council of Hull, England, authorizing tramway extensions among other things, the chairman of the tramways committee said that tramcars were safer than buses. To insure a bus carrying fifty-five passengers against accident cost £40, while to insure a tramcar carrying eighty passengers cost £4.

Light Signals on Edgware Extension.—The extension of the Charing Cross & Hampstead line of the London Electric Railway from Golder's Green to Edgware is being equipped with two-position color light signals, though little of the line is in tunnels. Semaphore arms are dispensed with, as the lights have a range of about 2,000 ft. even in bright sunshine. The lamps are fitted with lenses of 8 in. diameter, which project bright colored beams of light. The signaling is done automatically by means of track circuits in the same way as on the underground railways. Signals of this kind have been in successful use on the part of the railway from Golder's Green to Hendon which was opened for traffic last November. An all-electric system of point control and of train stops is being installed. Instead of detonators for foggy weather, fog repeaters are being fixed about 300 ft. in front of each colored light signal. The repeater is fixed on a post and throws out a powerful light on a level with the motorman's eye.

Metropolitan Railway Dividend.—The directors of the Metropolitan Railway, London, England, have declared a dividend at the rate of 5 per cent per annum for the second half of last year, making 4 per cent for the year, as compared with 3½ per cent for the previous year. £15,000 is placed to reserve and £35,000 carried forward.

Financial and Corporate

Revenue Passengers Decreasing

Washington Property Confronted with Curtailment of Governmental Work and Increased Use of Automobile

The balance of income for 1923 credited to profit and loss by the Washington Railway & Electric Company, Washington, D. C., was $151,327. To this there were added miscellaneous items of $136,578, largely profit from the sale of real estate, so that the total credit to profit and loss for the year was $287,906.

William F. Ham, president of the company, explained at the recent annual meeting of the stockholders that aside from dividends from the Potomac Electric Power Company included in the operating statement of the company, no income was received by the company on its investment in stocks of subsidiary companies. The regular dividend on the preferred stock, at the rate of 5 per cent per annum, was continued throughout the year, and on June 1, after a lapse of four years, payment of dividends on the common stock was resumed, three dividends of 1¼ per cent each having been paid during the year.

CONDENSED STATEMENT OF WASHINGTON RAILWAY & ELECTRIC COMPANY FOR YEAR 1923

Gross earnings from operation	$4,957,214	
Miscellaneous income (including dividends from Potomac Electric Power Company)	707,758	
Gross income		$5,664,972
Operating expenses (including depreciation), taxes and miscellaneous charges	$4,089,016	
Interest on funded and unfunded debt	755,878	
Payment of dividend on 5 per cent preferred stock	425,000	
Payment of dividend on common stock (3¾ per cent)	243,750	
		5,513,644
Balance of income for year 1923, credited to profit and loss		$151,328
Miscellaneous items (largely profit resulting from sale of real estate) credited to profit and loss during the year 1923		136,578
Total credited to profit and loss during the year 1823		$287,906

Mr. Ham explained that due primarily to the reduction of governmental activities since the war and to the greatly increased number of automobiles in use travel has been falling off almost constantly since the spring of 1920. Comparative figures follow:

	Revenue Passengers Carried	Number of Automobiles
1919	91,488,735	44,631
1920	87,782,784	56,148
1921	85,481,656	63,610
1922	82,716,756	79,546
1923	81,518,607	101,543

Thus the decrease in pay passengers in 1923, as compared with 1919, is 10.9 per cent. So large a decrease in traffic has made it impossible, with existing rate of fare of 8 cents cash or 6 tokens for 40 cents, to earn a reasonable return upon the value of the railway property as fixed by the Public Utilities Commission.

With respect to the bills introduced in Congress requiring the restitution of the 5-cent fare with six tickets for a quarter, Mr. Ham says it is impossible to return to a pre-war rate of fare until other conditions, over which the company has virtually no control, are again upon a pre-war basis.

The company placed in operation during the year thirty cars of the pay-within type for two-man operation and ten cars of the pay-within type for one-man operation. It also added seven buses, making the total number now in operation fifteen.

Bus operations have been substituted during the non-rush periods for street cars from Seventeenth and H Streets, N. W., around the Potomac Park Loop, continuing the street car operations in the morning and evening rush periods. Just prior to the close of the year the company extended the operation of this bus line to the Lincoln Memorial. Bus operation now furnishes service on two important lines of the company during the early morning hours when traffic is extremely light. On Aug. 1, a Southwest crosstown bus line was established by the Capital Traction Company for the joint account of that company and the Washington Railway & Electric Company, with an exchange of transfers between lines of both companies.

Mr. Ham says that while the introduction of buses was intended primarily to afford greater convenience to the public and has, in fact, greatly increased these facilities, the operation has been without profit.

Chicago "L" Reorganization Formally Declared Operative

The plan for the reorganization of the elevated railways in Chicago has been declared operative as to all classes of securities and claims entitled to participate therein. It is contemplated that the new securities deliverable by the committee to holders of certificates of deposit will be ready within a short time.

Charles E. Mitchell, chairman; George M. Reynolds, John H. Mason and R. Floyd Clinch, committee acting in the reorganization, say approximately 97 per cent of the secured gold notes and more than 90 per cent of ten-year 6 per cent debentures have been deposited under the plan of reorganization dated July 14, 1923; and in pursuance to the plan, the collaterals pledged for security of the notes have been acquired and the new company under the name of Chicago Rapid Transit Company has been organized. As has been announced previously in the ELECTRIC RAILWAY JOURNAL the new company is now operating the properties.

Increase in Columbus Surplus

Ohio Company Shows a Big Gain in Amount Left Over Charges, Taxes, Interest and Dividends

The Columbus Railway, Power & Light Company, Columbus, Ohio, reports good progress made in its affairs during the year ended Dec. 31, 1923. There was an increase over the previous year in the number of passengers carried, in transfer passengers, in revenue and in surplus derived. There was also an increase in surplus over all charges, including taxes, interest and dividends.

C. L. Kurtz, president of the company, says that it should be gratifying to the public, as well as to stockholders, to realize that the company, operating under rates of fare about 40 per cent lower than is the average rate of fare in all other cities of the country, has been able to attain surplus earnings necessary to the strengthening and continued upbuilding of the service.

Mr. Kurtz said in the pamphlet report of the company that the requirements of the company for the construction program of 1924 have not yet been arranged, but he did repeat the need of the company for fifty new cars.

During the year the dividend rate on Series "B" preferred stock was increased from 5 to 6 per cent, and a dividend rate of 6 per cent was declared on the common stock, thus putting all three classes of the company's stock on a 6 per cent basis. Mr. Kurtz further said that the growing interest and confidence of the public and of investors in the securities of the company is helping to produce satisfactory results to both the investors and the community served.

STATEMENT OF EARNINGS OF COLUMBUS RAILWAY, POWER & LIGHT COMPANY FOR YEARS ENDED DEC. 31

	1922	1923
Railway operating revenues	$3,611,590	$3,702,221
Power, light and heat operating revenues	3,880,440	4,749,233
Non-operating revenues	7,312	11,268
Total gross revenues	$7,499,342	$8,462,724
Operating expenses	$4,531,604	$4,955,526
Taxes	765,684	839,461
Gross Income	$2,202,054	$2,667,735
Deductions from Gross Income.		
Interest on funded debt	$818,554	$806,733
Interest on unfunded debt	12,341	13,354
Other deductions	77,628	62,042
Total deductions	$908,524	$882,130
Net income available for sinking fund, dividends and other financial requirements	$1,293,529	$1,785,604
Deductions from Net Income.		
Sinking fund	$245,845	$233,650
Dividends:		
Series A preferred stock	91,227	121,636
Series B preferred stock	188,014	300,998
Common stock		360,354
Balance (credit to profit and loss account)	$768,441	$768,96[illegible]

At this annual meeting the Columbus, New Albany & Johnstown Traction Company was completely purchased. This was a short interurban line the stock of which has been slowly acquired by the Columbus Railway, Power & Light Company, by which it has been operated the last two years.

Pay-as-You-Go Purchase Plan Suggested for San Francisco

The special committee, composed of supervisors and city officials of San Francisco, appointed a year ago to consider the purchase of the Market Street Railway by the city has blocked out a tentative "pay-as-you-go" proposition as a basis for conference with the railway.

The plan outlined contemplates submission of the purchase proposed to the people, but not as a bond issue proposition. The plan now contemplated to be put into effect would not involve the city in a bonded debt, and could be carried by a majority vote. On the basis of the gross receipts of the company's lines, deductions are to be subtracted for the increase of wages, amounting to $1,800,000 a year under the municipal pay schedule; for the operating expenses; for depreciation, and for interest upon whatever "price" is finally agreed upon. The committee stated that the nub of the whole matter would be this figure.

On the basis of the present showing it is estimated that it would take between twenty-five and forty years, according to the valuation finally agreed upon, to pay for the system. These figures are based on the present 5-cent fare.

Hearings Under Way Looking Toward Kansas City Foreclosure

Powell C. Croner, attorney for the committee representing the holders of the first mortgage bonds of the Kansas City Railways, urged before Judge Stone in the federal court at Kansas City recently that the valuation of the property be determined at once, after which a concrete plan for reorganization will be submitted to the court. Mr. Groner said the revaluation would be necessary eventually, and urged that it be made now so that complications in the future could be avoided. He said the plan of the first mortgage bondholders to foreclose then would be carried out.

Stockholders in the company asked permission to present a supplementary answer, containing a statement of their interests in the reorganization. Judge Stone took the application under advisement. Richard J. Higgins, attorney for the first mortgage bondholders, said the stockholders have waited too long to advance their claims. He contended both the bondholders and the stockholders were "in the same boat."

William Bostian, attorney, and Frank J. Peterson attended as representatives of the traveling public. To their plea for consideration Judge Stone replied that no definite plan of reorganization had been placed before him, but that when such a plan was presented, he would be glad to hear the opinions of patrons and others before taking final action.

Refunding Issue Authorized by California Commission

The Market Street Railway Company, San Francisco, has been authorized by the Railroad Commission to issue and sell for cash at not less than 93 per cent of their face value, and accrued interest, $13,000,000 of first mortgage 7 per cent sinking fund gold bonds to be dated April 1, 1924, and to mature April 1, 1940, and to use the proceeds obtained therefrom for the purpose of refunding its 6 per cent collateral trust notes due April 1, 1934, and its first mortgage bonds due Sept. 1, 1924.

The company agrees to provide a quarterly sinking fund at the rate of $500,000 per annum from Jan. 1, 1925, through 1932. The sinking fund payments are to be invested in the company's bonds, which are to be purchased in the open market at not to exceed their redemption prices, or if not so obtainable, are to be called at that price. All bonds purchased are to be kept alive in the sinking fund until Jan. 1, 1933, and the interest on such bonds is to be used to acquire additional bonds. On Jan. 1, 1933, all bonds then in the sinking fund shall be cancelled and thereafter the company agrees to provide a quarterly sinking fund of $300,000 per annum until the maturity of the bonds.

The commission in its decision points out that were it not for the fact that some of applicant's important franchises expire on or before Jan. 1, 1933, existing municipal competition, and the uncertainty of what the attitude of the city will be at the time the franchises terminate, the commission would not authorize the sale of the bonds at 93 and accrued interest.

It is estimated by the applicant that the operation of the sinking funds, assuming bonds purchased at the redempton prices, will reduce the bonded debt from $13,000,000 to $8,071,500, on Jan. 1, 1933, and to $5,460,500 on Jan. 1, 1940. The amount of bonds outstanding may be further reduced through the purchase of bonds at less than the call price, and through the sale of mortgaged property. The proceeds from the sale of any such property must be added to fixed sinking fund payment.

The bonds were recently offered for public subscription at 100 and accrued interest, subject to the approval of the commission.

Columbus, Newark & Zanesville Elect Officers and Directors

The stockholders of the Columbus, Newark & Zanesville Electric Railway, Springfield, Ohio, held their annual meeting Feb. 12 at Columbus. The following directors were named: Charles Day, Philadelphia, Pa.; John S. Bleecker, Springfield, Ohio; F. A. Healy, Springfield, Ohio; R. Z. Zimmermann, Zanesville, Ohio, and Edward H. Meyer, Zanesville, Ohio. The directors elected the following officers: Charles Day, president; R. Z. Zimmermann, vice-president; F. A. Healy, secretary and treasurer; J. M. Pogue, assistant secretary and treasurer; E. A. McClure, assistant secretary, and Melward Oliver, assistant treasurer.

Suit Brought to Set Aside Oakland Consolidation

A suit to set aside the reorganization of the San Francisco-Oakland Terminal Railways into the Key System Transit has been filed in the Superior Court of Alameda County by Joseph Bien, representing minority holders of the common stock of the old organization. The court is asked to rule the entire reorganization proceeding null and void and to restore the old company to solvency, basing this demand on the allegation that the company's properties are worth $50,000,000. Mr. Bien further declares that the common stockholders held $48,175,000 of stock and that their rights were not properly recognized in the resale of the property.

Conspectus of Indexes for February, 1924

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Feb. 1924 **6.93**	Jan. 1924 **6.91**	Feb. 1923 **6.94**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Jan. 1924 **159**	Dec. 1923 **156**	Jan. 1923 **175**	Sept. 1920 **247**	[illegible] 1921 **156**
Street Railway Wages* 1913 = 100	Feb. 1924 **219**	Jan. 1924 **219**	Feb. 1923 **207**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Jan. 31 1924 **4.80**	Dec. 31 1923 **4.45**	Jan. 31 1923 **6.91**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Jan. 1924 **16.14**	Dec. 1923 **15.90**	Jan. 1923 **16.00**	Mar. 1920 **18.54**	Feb 1922 **10.65**
Business Failures Number	Jan. 1924 **2,258**	Dec 1923 **1,852**	Jan. 1923 **2,203**	Jan. 1924 **2,258**	Sept. 1923 **1,280**
Liabilities (millions)	**109.1**	**80.37**	**53.60**	**109.1**	**27.50**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Feb. 1924 **220.3**	Jan 1924 **217.9**	Feb. 1923 **197.4**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Jan. 1924 **151**	Dec. 1923 **151**	Jan. 1923 **156**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913 = 9.21	Feb. 1 1924 **13.20**	Jan. 1 1924 **13.27**	Feb. 1 1923 **13.72**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120 9	Feb. 1 1924 **191.1**	Jan. 1 1924 **189.9**	Feb. 1 1923 **186.2**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Jan. 1924 **149**	Dec. 1923 **150**	Jan. 1923 **144**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Jan. 1924 **164.6**	Dec. 1923 **165.0**	Jan. 1923 **158.1**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

Interborough Rapid Transit Will Appeal Dividend Decision

Justice Ford of the New York Supreme Court on Feb. 13 sustained the demand of Nina M. Peabody, holder of shares of Manhattan Railway stock, who sought to recover payment of 7 per cent on the par value of her holdings from Jan. 1, 1922. The action was brought against the Interborough Rapid Transit Company.

Justice Ford held that the Interborough Rapid Transit when it took a lease of the Manhattan Railway for 999 years guaranteed to pay 7 per cent dvidends to Manhattan Railway stockholders for all times unless all "holders of record should join in consenting to a modification." The defendant contended that the earnings of the elevated lines no longer warranted the 7 per cent payment and after negotiations the majority of the Manhattan holders agreed to a modification of the terms of the payments under the lease.

The decision will be appealed to the Appellate Division of the State court. It is pointed out by Interborough interests that the decision is just the opposite of that handed down by Justice Lehman of the same court some time ago on the same question, action having been brought by another stockholder. In other words, due to a technicality, contrary opinions have been handed down on the same question, according to the attorneys. Both cases will be decided by the higher court.

Net Income Increases in Detroit

The Department of Street Railways, city of Detroit, for the month of December, 1923, reported a total operating revenue of $1,876,514, against $1,650,927 for December, 1922. These figures included respectively $1,828,908 and $1,560,663 for total revenue from transportation. Total operating expenses showed an increase, being $1,213,884 in December, 1922, and $1,375,141 in December, 1923.

The net revenue from railway operations amounted to $501,373 in December, 1923, against $437,043 in December, 1922. The net income increased from $47,271 to $65,254. There were 39,504,361 passengers carried in December, 1923, and 38,258,194 in December, 1922.

Foreclosure Sale at Birmingham Set for March 15

Announcement is made of the proposed sale of the property of the Birmingham Railway, Light & Power Company, Birmingham, Ala., under foreclosure on March 15.

The Tidewater line, which runs from East Lake to Ensley, a distance of about 14 miles, will not be included in the sale, it is stated. Some weeks ago the receivers of the company asked permission of the City Commissioners to abandon certain portions of the Tidewater track, saying that this line did not pay and that it was a burden to the other lines. This request was refused. It is stated that if the receivers and the City Commissioners are unable to agree on the disposition of the Tidewater line the Alabama Commission will be asked to settle the matter.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Public Service Reports Deficit.—A deficit of $319,654 in the net income of the Public Service Railway, Newark, N. J., is indicated in the company's financial statement for 1923. This is in contrast to a net income of $543,905 for 1922 and is attributed largely to the strike of the employees last fall. The operating revenue for the past year was $20,878,799, compared with $26,116,405 in 1922. Operating revenue deductions were $17,223,886 in 1923 and $20,492,478 in 1922, while the operating income for each of the two years was $3,668,616 and $5,647,209 respectively.

Will Redeem Coupon.—Coupons No. 22, dated Sept. 1, 1917, of the general consolidated first mortgage fifty-year 5 per cent gold bonds of the Mexico Tramways will be redeemed on and after March 1.

Lighting Property Purchased.—The Marion & Bluffton Traction Company, Bluffton, Ind., already engaged in the power and light business, has bought the property of the Linn Grove Light & Power Company, consisting of 50 miles of line and city equipment.

Boston "L" Bond Issue Approved.—The Massachusetts Department of Public Utilities has approved issuance by the Boston Elevated Railway of $2,098,000 of thirty-year 6½ per cent bonds. They will be callable after ten years at 105. Of them $1,500,000 will be used for refunding. The application of the company was referred to previously in the ELECTRIC RAILWAY JOURNAL.

$1,836,712 Net Income.—For the six months ended Dec. 31, 1923, the Brooklyn-Manhattan Transit System, Brooklyn, N. Y., and its affiliated companies reported a total operating revenue of $19,576,898. The expenses were $13,001,474. These two figures are compared with $18,110,247 and $11,954,375 for the same period ended Dec. 31, 1922. The net income in 1923 for the six months amounted to $1,836,712. There is no figure to be compared with this 1923 net income on account of the receivership and reorganization.

Tax Not Discriminatory.—The Washington State tax upon street railways is not discriminatory nor confiscatory, the United States Supreme Court declared Feb. 18 in a decision adverse to the Puget Sound Power & Light Company and the city of Seattle in their suit against the County of King, and others. The company sold its street railway lines to the city in 1919. Prior to the sale state and county taxes had been assessed. The city joined the company in resisting the tax on the ground it was assessed on a higher basis than other property. The Supreme Court found nothing illegal in the method of assessment.

Ohio Road to Be Sold Under Hammer.—The property of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, will be sold at auction at Elyria on March 14, an order for the foreclosure sale of the property having been issued by Federal Judge D. C. Westernhaven, on application of bondholders and creditors. The company has outstanding $4,236,000 of common stock and $2,413,000 of cumulative 5 per cent preferred. It was put into receivership on Jan. 20, 1922, on an insolvency petition filed by the General Electric Company.

Officers and Directors Elected.—At the annual meeting of the Columbus Interurban Terminal Company, held on Feb. 12, in Columbus, Ohio, the following officers were elected: A. V. Bland, Columbus, Ohio, president; A. T. Van Denise, Marion, Ohio, vice-president; F. A. Healy, Springfield, Ohio, secretary and treasurer. The following directors were also named: A. V. Bland, Columbus, Ohio; J. M. Pogue, Springfield, Ohio; R. Z. Zimmermann, Zanesville, Ohio; J. S. Bleecker, Philadelphia, Pa.; A. T. Van Denise and W. P. Maloney, both of Marion, Ohio.

New Director Elected.—Morton J. Jourdan, attorney, who has represented the North American Company in the receivership litigation in connection with the affairs of the United Railways, St. Louis, was elected a director of the company at the annual election held on Feb. 11. He succeeds R. L. Warner.

Increase in Passengers Carried.—The net income of the Philadelphia Rapid Transit Company, Philadelphia, Pa., for January, 1924, was $250,317, against $250,100 for the same month a year ago. The passenger revenue amounted to $3,748,596, an increase over 1923, when it was $3,625,768. The number of passengers carried increased from 74,857,899 in January, 1923, to 78,297,258 in the same month of the current year.

Strike Cost $1,027,238.—The International Railway, Buffalo, N. Y., reports a deficit of $1,027,238 for the year 1923, which represents the company's strike cost. In 1922 the deficit was $4,171,847 and in 1921 the company reported a net income of $99,110. The operation and taxes showed a falling off, the 1923 figure being $9,293,963, against $10,044,655 for the year 1922.

Maine Property Fails to Earn Enough.—For the year ended Dec. 31, 1923, the Cumberland County Power & Light Company, Portland, Me., had a surplus of $283,480, against a surplus of $352,881 for the same period a year ago. The Portland Railroad, which is leased by the Cumberland County Power & Light Company, reports a deficit for the year ended Dec. 31, 1923, amounting to $40,897, against a deficit of $4,913 for the year previous. The report to the stockholders says that the operations of the Portland Railroad property resulted in its failure to earn the guaranteed 5 per cent dividend upon the railway stock by nearly $41,000.

Part of Line Near New London Abandoned.—Service on the Shore Line Electric Railway from Keeney's Corner, town of Waterford, to Bank Street and Montauk Avenue, New London, has been discontinued following an order issued by the New London County Superior Court on Jan. 18. Transportation service between the two points will be maintained by a bus line. The railway is in the hands of a receiver.

Traffic and Transportation

Fare Changes Suggested

Oklahoma City Committee Against Trustees' Operation—Use of Pass With Ten-Cent Fare Suggested

A report adverse to the proposal has been presented by the committee of the Chamber of Commerce at Oklahoma City appointed to consider among other things the suggestion that a committee from local civic organizations take over the Oklahoma Railway as trustees and operate the property for one or two years.

The committee recommends an increase in fare and revision of traffic ordinances in the interest of continued service in Oklahoma City and favors the operation of the property by its present executives.

The committee asks the Chamber of Commerce to request the State Corporation Commission to authorize new rates as a temporary relief measure, subject to further change in a permanent order following a complete investigation of conditions. The increase recommended includes the adoption of the weekly pass plan at $1.25 and an increase of single fares from 7 cents to 10 cents, with three tickets for 25 cents in place of four.

The committee also requests the Chamber of Commerce to ask the City Commissioners to revise the traffic ordinances. This revision would restrict parking in the business center of the city and otherwise restrict the use of street car tracks for automobile traffic to the end that fewer interruptions and greater speed of street cars be permitted.

The committee reports against suspension or abolishment of service on lines now serving certain outlying districts where operating costs are clearly not justified by traffic.

Charges Discriminatory Rates Against Clayton, Mo.

In a decision handed down on Feb. 13 the Missouri Public Service Commission held that the difference between the Clayton and Maplewood rates charged by the United Railways was discriminatory against Clayton. The distance from the downtown section of St. Louis to Clayton is 9 miles, while the distance from the same section to the Maplewood loop is 8¼ miles. The United Railways was instructed to file a new rate to be effective right away. The Claytonians asked for a 7-cent rate between the Clayton Court House and points in St. Louis.

Col. Albert T. Perkins, general manager for Receiver Rolla Wells, denied the discrimination and said that the company would ask for a rehearing. If such rehearing is not granted, he stated it would be necessary, in order to comply with the order of the commission and not carry passengers at a loss, to change the fare zone limit on the Manchester line to the city limits loop instead of at the Sutton Avenue loop as at present. This will result in the fare advance from points in the city of St. Louis to Sutton Avenue in Maplewood from 7 cents to 14 cents.

Traffic Survey in Madison

In response to a complaint the Wisconsin Railroad Commission will undertake an investigation into the service of the Madison Railways. W. H. Damon, engineer of the commission, will be in charge. A traffic count will be made on every line during the rush hours to determine whether or not the company is furnishing sufficient service to handle peak loads. Heating conditions in cold weather will also be covered by the investigation.

Joint Steam and Electric Service in Texas Popularized

The Texas Interurban Railway, operating from Dallas to Terrell, Tex., has effected a working agreement with the Texas Midland Railway, a steam line operating from Ennis, Tex., to Paris, Tex., and passing through Terrell, by which through tickets are sold on either line to points on the other at short-line rates. Close connection is also made at Terrell between the interurban cars from Dallas and the trains on the Texas Midland, so that passengers purchasing through tickets will not have a long wait. Both lines use the same depot, which adds greatly to the convenience of those purchasing through tickets.

Arrangements have also been completed whereby patrons of the Texas Interurban Railway or of the Texas Midland Railway may use the facilities of either or both companies for making Pullman reservations in Dallas, for reserving theater tickets, making appointments in Dallas, etc. This unusual service rendered by the Texas Interurban Railway is proving very popular, and patrons of the electric line residing in Terrell or along the line of the Texas Midland frequently make such reservations or appointments in Dallas. The service is rendered through agents of the lines in the various stations, the dispatcher's phone lines of the companies being used. It has done much to popularize the joint service rendered by the two lines.

The union of an electric line with a steam railroad is regarded as unusual, but it is known that negotiations have been under way for some time looking to the electrification of the Texas Midland by the interests who own the Texas Interurban Railway, and the close affiliation of the two lines now is regarded as an indication of an early electrification of the Texas Midland. Officials of the Texas Interurban Railway, however, are not ready to make public any details of the proposed electrification.

Muncie Jitney Operators Defended

Arguments have been heard by Judge Robert F. Murray in the Superior Court on the motion to dissolve the temporary restraining orders covering fifteen defendants in the suit brought by the Union Traction Company of Indiana against twenty-five Muncie jitney operators.

William A. Thompson, former judge of the Circuit Court, appeared for thirteen of the defendants. He attacked the restraining order on the grounds that the information in the complaint was not properly verified. Other defendants attacked the restraining order on other grounds, chiefly that the city ordinance pertaining to jitneys was illegal.

Suggests Commission Dispose of Philadelphia Ordinance

Mayor Kendrick of Philadelphia, Pa., recently suggested that the entire bus ordinance controversy should be turned over to the Transit Commission for settlement. Further, that that body should be urged to work out an agreement favorable to both the city and the Philadelphia Rapid Transit Company. The bus ordinance calls for the granting of franchises for four bus lines to the Philadelphia Rural Transit Company, which is controlled by the Philadelphia Rapid Transit Company.

The day previous to the Mayor's suggestion the Council had returned the ordinance to the transportation committee for further hearing. Simon Walter, chairman of the committee, said that the return of the bill was based solely on objections which have been raised to the clause providing for a financial return to the city for the use of the streets and fixing the date of expiration of the lease as 1957. Opponents have stood for a short-term lease.

More Passengers Ride the Cars in Elmira in 1923

The Elmira Water, Light & Railroad Company, Elmira, N. Y., carried 8,237,480 passengers on its city lines in 1923, compared with 8,137,518 in 1922 and 7,447,068 in 1921. All these passengers were carried without a single serious accident to any passenger. These facts were disclosed in the brief report about the accomplishments of the company in 1923, recently submitted to the stockholders.

The company states that this is the least prosperous of the departments, due to the large and increasing number of automobiles, the habit many automobile drivers have of "picking up" friends or even strangers who are waiting for street cars and the congestion in the downtown streets. With the brief report was attached an editorial reprinted from the ELECTRIC RAILWAY JOURNAL on "A Basis for Getting the Merchants to Accept Traffic Regulation."

These things were all emphasized particularly for the benefit of the local stockholders.

Talks to Northeastern "Civils."—Edward Dana, general manager of the Boston Elevated Railway, addressed the Northeastern Section of the American Society of Civil Engineers at the Boston City Club recently upon "The Elevated as You Should Know It." The talk comprehensively outlined the Boston transit problem as it is being solved by the company.

Save the Children.—Mayor Kendrick of Philadelphia, Pa., recently designated Feb. 21 as Public Safety Day, to reduce the growing number of accidents to children in the city. Safety rules have been laid down for children in streets and all have been urged to do their part in reducing the death rate.

Applies for Ten-Cent Rate.—A net operating loss of more than $70,000 in 1923 is responsible for the application of the Androscoggin & Kennebec Railway, Lewiston, for permission of the Maine Public Utilities Commission to install a 10-cent zone rate on all lines of the system. It is expected an increase in revenue to the amount of $130,000 would result from the 10-cent rate. The zone rate has been 9 cents.

Bus Operation Ordered Discontinued.—The Board of Public Utility Commissioners of New Jersey has ordered George Zellers, Sr., George Zellers, Jr., Louis Kessler and Frank Sidone to cease the operation of any bus upon any street in the city of Millville, in the Borough of Vineland or between these places upon which the Millville Traction Company operates a railway line effective Feb. 20, 1924.

By Their Badges Ye Shall Know Them.—A neat coat lapel badge of blue enamel and white metal has been supplied to Los Angeles Railway trainmen and will be the official insignia of the company. It has the initials "L. A. Ry. Co." and must be worn on the left coat lapel. Recently brass buttons for trainmen's uniforms were discarded and plain black buttons substituted so that employees might get greater use from their uniforms as civilian suits. The brass button had the official insignia of the company, but with the change to the use of the lapel badges, the insignia of service is required to be worn only while a man is in service on the cars. A charge of $1 is placed against the record of each man to whom a badge is issued, but this sum is returned on the surrender of the badge when the man leaves the service.

Protests Bus Certificates.—The Lima Street Railway, Lima, Ohio, filed protests with the State Public Utilities Commission on Feb. 15 against the granting of certificates to many former employees of the company to operate bus lines in Lima.

Invites Motorists to Use Tracks.—Motorists of Muskegon, Mich., have been invited by George Steinwedell, president and manager of the Muskegon Traction & Lighting Company, to use the car tracks for travel since 4 ft. of snow make going impossible otherwise in certain sections of the city. At the same time Mr. Steinwedell announced that railway employees had been requested to show every courtesy to motorists and incidentally asked for the co-operation of the driving public in limiting delays due to automobiles and trucks. The statement created a friendly spirit between motorists and the company and won many friends for the company. Motorists had been using the tracks because of the snowdrifts and so Mr. Steinwedell decided that there should be co-operation.

Planning Opening of New Line.—Officials of the Des Moines City Railway, Des Moines, Iowa, are making more or less elaborate plans for the formal opening of the new Crocker Street line. The line now ready has been in prospect for many years as it was one of the proposals incident to the 1915 franchise election, but its construction was delayed by the war period and later by the receivership. Eight of the new passenger cars ordered by the company several months ago are ready for service and the initial trip over the new line will be made by one of these new cars carrying city officials, newspaper editors and representatives of various civic and improvement organizations.

Seeks to Reduce Fares.—The Detroit United Railway, Detroit, Mich., has applied to the Public Utilities Commission for permission to reduce fares between Detroit and Pontiac from 52 to 26 cents, effective March 1. The reduction would apply only to commutation fares.

Ticket Privilege Extended.—It was decided at a recent meeting of the board of directors of the Montreal Tramways, Montreal, Que., to extend the privilege of using children's tickets to school children under the age of eighteen years, while children or students between the ages of fifteen and eighteen are to be obliged to carry identification cards with their portraits thereon. The hours during which these tickets will be valid extend from 7 a.m. to 7 p.m. on every day of the week. This change will go into effect immediately.

Bus Line to Accommodate Students.—The Portland Railway, Light & Power Company, Portland, Ore., has announced that a new crosstown bus line will be established to provide transportation for students of the U. S. Grant High School. This is the first bus line announced by the company and was decided upon when investigation showed that the cost of laying new car tracks and overhead line had quadrupled since 1914.

No More Letter Boxes on Street Cars.—Light motor trucks have superseded the cars of the Twin City Rapid Transit Company in the carriage of letter mail between Minneapolis and St. Paul. In daylight hours each through street car operating over the shortest route between the two cities carried a letter box on the rear platform outside. Letters could be mailed anywhere on the route and bundles of letters were put on the cars at both postoffices. This service had been in operation twenty-four years. The trucks leave either city every half hour at the rush time and every hour the rest of the day. They carry more classes of mail and stop at substations en route and may be stopped along the road to receive mail. The trucks are operated by the postoffice department.

Bus Company Seeks to Operate.—The Ohio Utilities Commission has forbidden the Red Star Bus Company to operate between Columbus and Chillicothe. The decision was based on the statement that the Scioto Valley Traction Company, operating between the two points, was furnishing adequate service. The Red Star Bus Company has declared, in a brief filed in the Supreme Court recently, that motor bus transportation in Ohio is "doomed" if the ruling of the commission is to stand as a precedent.

Wants No Speed Restrictions.—The Birmingham Railway, Light & Power Company, Birmingham, Ala., has requested the City Commission to take off all restrictions on the speed limit of its cars or place them on the same running basis as automobiles. The ordinance under which the cars now operate fixes the maximum speed at 8 m.p.h. at crossings, with 12 m.p.h. between intersections. The automobile limit is 15 m.p.h. at crossings and 25 m.p.h. between intersections.

Safety Example Followed.—Following the example of the Wisconsin division of the Chicago & North Western Railroad, which is carrying on a safety campaign for the elimination of grade crossing accidents by requesting employees of the company having automobiles to come to a stop upon approaching such crossings, the safety committees of the Eastern Wisconsin Electric Company, Sheboygan, Wis., plans to follow the same idea. All employees of the company will be requested to follow the same procedure when approaching crossings whether steam or electric railway.

Denver Tramway Wins.—The winners of the electric railway prizes in a recent essay contest were all employees of the Denver Tramway, Denver, Colo. The Rocky Mountain Committee on Public Utility Information offered prizes to the various employees of the different cities over which its jurisdiction extended. The competition was that of knowing the "why and the how" of the public utility that employed them, so that seekers after information would receive the necessary assistance. The public utilities services covered were tramway, electric light and power, gas and the telephone. In all there were ninety contestants.

Six Cents in Shreveport.—The fare now in effect in Shreveport, La., is 6 cents. The three-year controversy, court fights and counter-suits were terminated some weeks ago by the dropping of the 7-cent rate and the restoration of the 6-cent fare, which is the amount the citizens allowed in the election of 1920. When the courts decided that the election was illegal the fare went to 5 cents. The Shreveport Railways then raised the fare to 7 cents, which was contested by the Public Service Commission. The Industrial Bureau of the Shreveport Chamber of Commerce intervened and through its efforts a settlement was brought about by which the rate of fare of 6 cents was restored. The various developments in the controversy have been covered from time to time in these columns.

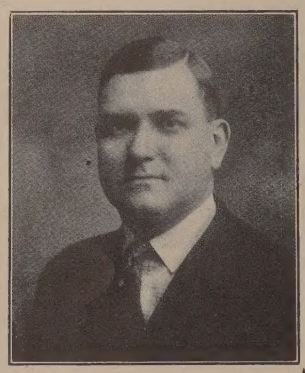
Personal Items

Accountant Becomes Manager

J. M. Pogue, Long Connected with Ohio Interurbans, Will Conduct Indianapolis, Columbus & Eastern Traction Line

J. M. Pogue, recently appointed general manager of the Indianapolis, Columbus & Eastern Traction Company, has literally grown up with the business and has done little else but work on railroads since he was old enough to work. Still in his middle thirties, Mr. Pogue has been connected with Ohio interurban properties since 1907. He began as an accountant in the office of the comptroller of the Cincinnati Traction Company and later became chief accountant of the Cincinnati Northern Traction Company.

When the general offices of the



J. M. Pogue

Ohio Electric Railway system were moved to Springeld, in 1914, Mr. Pogue was appointed assistant secretary and treasurer and remained on that job until 1917, when he was promoted to the office of general purchasing agent for the entire system. When the property went into a receiver's hands in 1921, he was retained as general purchasing agent of the various leased properties which had been welded into the system, including the Indiana, Columbus & Eastern Traction Company, the Columbus, Newark & Zanesville Electric Railway, the Lima & Toledo Railroad and the Lima City Street Railway.

In his new position as general manager for the Indianapolis, Columbus & Eastern Traction Company he will have charge of the operation of the interurban lines from Dayton to Columbus and from Springeld to Lima, two of the busiest in the State of Ohio.

M. L. Campbell, Buffalo, has been appointed superintendent of the Lockport and Olcott interurban division of the International Railway, Buffalo. This appointment has been announced by R. C. Larkin, Niagara Falls, general superintendent of the interurban divisions of the International. Mr. Campbell succeeds John Duerr of North Tonawanda.

W. S. Jenkins has been appointed division superintendent of the Market Street Railway, San Francisco, Cal. He will be in charge of the Twenty-fourth, Utah and Third Street divisions.

H. C. Mackay, who has been treasurer of the Wisconsin Railway, Light & Power Company, Winona, Minn., for many years, will assume the joint duties of secretary and treasurer, as William M. Chester, for many years secretary, has resigned.

Grant Bergsland, connected with the Wisconsin Railway, Light & Power Company, Winona, since July, 1923, has been appointed master mechanic in charge at La Crosse.

A. C. Ward has replaced S. W. Willers as chief engineer of the power station of the Fort Smith Light & Traction Company, Fort Smith, Ark.

R. B. Keating has been elected treasurer of the Monongahela-West Penn Public Service Company, Fairmont, W. Va., to succeed the late Walton Miller. Mr. Miller was also secretary of the company and in that capacity he has been succeeded by S. E. Miller, who was assistant secretary.

John E. Zimmermann, of Day & Zimmermann, was elected president of the York Railways, York, Pa., at the meeting of the board of directors on Jan. 22.

C. T. Wingate, conductor on the Market Street line of the Louisville Railway, was elected employee-director of the company by a vote of the employees on Feb. 14. He succeeds D. L. Kehl, who had served two one-year terms on the board of directors, as employees' representative. Mr. Kehl came from the maintenance of ways department and was runner up for a third-term election.

Otto H. Adams, in the employ of the Indiana Service Corporation, Fort Wayne, Ind., since 1908 and for some time chief clerk to J. A. Greenland, has been made district freight and passenger agent, succeeding John W. Lowry. J. F. Beber, ticket agent, in the employ of the company for sixteen years, will succeed Mr. Adams as chief clerk to the superintendent. William Zimmerman, ticket agent at Lafayette, will assume the former duties of Mr. Beber as ticket agent in Fort Wayne. Leonard Nipple, assistant agent at Logansport, has been promoted to ticket agent, succeeding Mr. Zimmerman at Lafayette.

Henry Grant, recently appointed superintendent of the Tacoma lines of the Puget Sound Electric Railway, entered the service of the Stone & Webster interests in 1912 as electrical engineer and roadmaster for the Pacific Northwest Traction Company in Bellingham. He remained in this position until 1917, when he entered the U. S. Army, serving until 1919. From 1919 to Dec. 31, 1923, Mr. Grant served as superintendent of the interurban and city lines of the Puget Sound Railway in Everett, when he was advanced to his present position. He was graduated from Cornell University in 1912 as a mechanical engineer.

J. E. Wayne Vice-President and General Manager at York

Joseph Edward Wayne, formerly vice-president and assistant general manager of the York Railways and subsidiary companies, has been made vice-president and general manager at York, Pa. Mr. Wayne has been associated with several large electric railway properties in various sections of the country. He served for three years in the repair shops and power house of the Public Service Corporation of New Jersey, and later became identified with the transportation department of the United Railroads of San Francisco. Still later he became superintendent of the Chambersburg, Greencastle & Waynesboro

J. E. Wayne

Street Railway. He resigned from this company and entered the services of the Edison Light & Power Company in York and in 1909 was appointed superintendent of transportation of the York Railways. Following this, he was advanced to the position of vice-president and general manager. Mr. Wayne was born in Philadelphia.

Martin Juhl, for many years district superintendent of the Lake Superior District Power Company, Ashland, Wis., has been selected to take charge of the electric distribution plant of the Washburn Electric Light & Power Company, which the Lake Superior District Power Company recently took over.

George Teague has been promoted to the position of assistant railway superintendent of the Pacific Northwest Traction Company and Puget Sound International Railway & Power Company in Everett, Wash., to replace C. C. Coates, who has been advanced to the position of superintendent. Mr. Teague has been connected with the company for the past five years in the operating department.

Obituary

Dr. Henry Jameson

Dr. Henry Jameson, prominent in the medical, business and civic life of Indianapolis for nearly half a century, died on Feb. 13 at his home in that city, after a brief illness, of pneumonia.

Dr. Jameson was chairman of the board of directors of the Indianapolis Street Railway and the chairman of the general plan committee of the Butler College board of trustees, in charge of developing the project for removing Butler College to its new site in Fairview Park. For a number of years he was a member of the Board of Park Commissioners, his labors with that body causing him to become known as the father of the city's boulevard system.

Dr. Jameson was one of the leading physicians of the city and was active in teaching at medical schools during the latter part of the nineteenth century and the early part of this. He had not been active in the practice of medicine for about ten years, although he still retained an office and was called into consultation at times.

B. L. Knowles, manager of the publicity department of the Worthington Pump Corporation, died on Feb. 14. Mr. Knowles was forty-five years old. He had been in the employ of the Worthington company for twenty-eight years.

John Mahoney, superintendent of the Hudson Valley Railway, Glens Falls, N. Y., died recently. He had been associated with the Glens Falls property from the time it was under construction. When the work was completed and the route covered the entire distance from Warrensburg to Troy Mr. Mahoney assumed the duties of superintendent.

Edward Heydon, age fifty-four, superintendent of overhead of the Indianapolis Street Railway, died Feb. 7 in Indianapolis, after an illness of one day. He had been employed by the present Indianapolis company and its predecessors twenty-five years.

John Graham, Philadelphia, who, with Percy Warner of Nashville, was one of the receivers of the railway system included in the Chattanooga Railway & Light Company, died at his home in Philadelphia on Feb. 7. Mr. Graham was a consulting engineer with a national reputation. He was graduated as civil engineer from Lehigh University and first engaged in steam railroad work. After many years in this and allied lines he established himself as a consulting engineer, dealing largely with public service corporation problems.

William Flinn, former state Senator of Pennsylvania, died in St. Petersburg, Fla., on Feb. 19 following an attack of pneumonia. The firm of Booth & Flinn, of which he was the head, built a large part of the New York subways and at the present time holds the contract for the new vehicular tube which is being built under the Hudson River.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Outlook in East Promising

General Tripp, Just Returned from Orient, Says Foreign Customers Need America's Help

American manufacturers must be prepared to help in the financing of foreign power developments and to co-operate in the expanding of electric service, if we are to develop our foreign trade on an extensive scale. This opinion was firmly expressed by General Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, who has just returned from a trip around the world, in which he visited Japan, the Philippines, China, India and Europe. It was during his stay in Japan that General Tripp consummated the arrangements whereby the Westinghouse Electric & Manufacturing Company, together with the Westinghouse International Company, joined in co-operative agreements with the Mitsubishi interests and Takata & Company to bring about more rapid developments in electrical manufacture in Japan.

The Japanese people, General Tripp said, are re-establishing themselves from an electrical standpoint very rapidly. Only one of the large power properties was seriously damaged by the earthquake, although the destruction of transmission and distribution lines was considerable in the devastated district. A very large volume of installation work will be required in the rebuilding of Tokio, Yokohama and other communities within the zone of destruction. The great bulk of Japanese activity in the electrical field, however, is concerned with the expansion of the superpower system, which is rapidly being extended through the building of new hydro-electric stations and interconnection of existing plants.

In the Philippines, China, India and other Asiatic countries there are prospects for extensive industrial developments, but the American business man must not be deceived by the idea that Asia is industrially comparable with Europe or with America, General Tripp said.

General Tripp devoted most of his time to the Far East and made no extended investigation of conditions in Europe. He stressed the importance of recognition on the part of American manufacturers that they owe a responsibility to their foreign customers to extend practical co-operation, assisting them in the generation and utilization of electrical power, both through aid in financing their projects and through guidance in their commercial pursuits.

To Finance Industrial Buildings

A new plan to put the purchase of industrial buildings on a "pay for them as they earn for you" basis has been announced by the Blaw-Knox Company, Pittsburgh. Factories, machine shops, commercial garages, etc., may be bought in this way.

"The need for such a plan has been evident for some time," says A. C. Lehman, president of the company.

"Expansion of a business puts pressure on all available funds. To develop new markets, finance increased production and sales effort, as well as meet current liabilities, frequently requires so much more money than is available that the contemplated progress is impossible. Our plan has been developed after many months of careful study by some of the most capable financial experts in this country. And it is big enough to provide for the financing of industrial buildings of every sort."

Long Bell Extends Operations

The Long Bell Lumber Company, after many years of manufacturing in the pine districts of the South, is transferring its operation to the Pacific Northwest. At Longview, Wash., this company is erecting what is planned to be the largest lumber manufacturing plant in the world. It will be ready to operate in the summer of 1924. This will place the Long Bell company for the first time in the forty-eight years of its history definitely in the Douglas fir market.

Heretofore this company has put all of its efforts into products that had a well defined and somewhat limited territory. With the addition of the fir lumber the scope of its activities will be greatly increased. It is planned to undertake the manufacture of ties on a large scale.

By the latter half of this year it is hoped to develop a new market as large as that now handled by its present Southern mills. With the opening of the fir operations it will be the largest lumber manufacturing company in the world.

Metal, Coal and Material Prices

Metals—New York	Feb. 21, 1924
Copper, electrolytic, cents per lb	13.375
Copper wire base, cents per lb	15.50
Lead, cents per lb	8.70
Zinc, cents per lb	7.25
Tin, Straits, cents per lb	54.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.75
Somerset mine run, Boston, net tons	2.25
Pittsburgh mine run, Pittsburgh, net tons	2.125
Franklin, Ill., screenings, Chicago, net tons	1.95
Central, Ill., screenings, Chicago, net tons	1.50
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.60
Weatherproof wire base, N.Y., cents per lb	17.75
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$0.96
White lead, in oil (100-lb. keg), N.Y., cents per lb., carload lots	11 75
Turpentine, (bbl. lots), N. Y., per gal	$1.03

Railways Buying Safety Coaches

That electic railways are rapidly increasing their motor bus equipment is shown by the report of a single bus manufacturing concern relative to the sale of buses to railways since Jan. 1, 1924. Fageol equipment has been placed in this field during that time as follows: Milwaukee Electric Railway & Light Company, Milwaukee, Wis., five observation parlor safety coaches; Pacific Electric Railway, Los Angeles, Cal., sixteen safety coaches; Los Angeles Railway, Los Angeles, Cal., eleven safety coaches; San Diego Electric Railway, San Diego, Cal., ten safety coaches; Westmoreland County Railway, Pittsburgh, Pa. (Chestnut Ridge Transportation Company), two safety coaches.

Rolling Stock

London Street Railway, London, Ont., during 1923 increased its equipment by the addition of five one-man safety cars and three all-steel, double-truck cars of the Peter Witt type.

York Railways, York, Pa., it is reported, will buy new cars.

Track and Line

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., will repair its tracks on Madison Street, from North Street east to Broadway and on Broadway from Madison Street to the intersection of Wisconsin Avenue. This is in accordance with the recent approval by the City Council of the resolution providing for this improvement with concrete. A controversy had existed between the railway and the city with respect to the paving program, which was to be completed within one year.

Pacific Electric Railway, Los Angeles, Cal., has been granted permission by the Railroad Commission to construct a double track in Lake Avenue at grade across Washington, Rio Grande, Curtis, Denver, Howard Place, Elizabeth, Topeka and Atchinson Streets and a portion of Woodbury Road, and also to construct two turn-outs across portions of Lake and Washington Streets in the city of Pasadena. The company has been ordered to lower its tracks to specific grade level on American Avenue between Anaheim Street and North Long Beach. The company must eliminate curbs and pave the avenue full width from curb to curb.

San Diego & Arizona Railway, San Diego, Cal., has received permission to construct a spur track at grade across Eighth, Seventh, Sixth, Fourth and Second Streets and Fourth and Fifth Avenues in National City, San Diego County.

Duluth Street Railway, Duluth, Minn., is favorable to the extension of its Woodland Avenue line to Calvary cemetery, which is being urged by the Homecroft Community Club.

Ottawa Electric Railway, Ottawa, Ont., has plans looking toward building a double-track extension on Fairmont Avenue from Wellington.

Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis., is being asked to extend its railway line to Fall Creek. The distance between Eau Claire and Fall Creek is 18 miles.

London Street Railway, London, Ont., did considerable track improvement work in 1923. The pavement on Stanley Street for a distance of 1,500 ft. was completed, the track being renewed with new rail, ties and concrete foundation. The track on Briscoe Street, for a distance of 2,000 ft., was constructed with new ties on concrete foundation and paved. The double tracks on Richmond Street, from Oxford to Dufferin Avenue, approximately 1¼ miles of single track, were entirely rebuilt and paved, new rail, ties and concrete foundation being used. In addition, the rail on Oxford Street, on Wellington Street south and on Horton Street, totaling 1⅝ miles, was replaced with new rail.

York Railways, York, Pa., has announced improvements to be made at a cost of $100,000. It will extend its Richland Avenue line to Mill Road; the track on Overbrook Avenue from Market to King Street will be reconstructed. A new siding will be placed at Eagle Park, a rural resort, and a siding constructed at North York.

San Diego Electric Railway, San Diego, Cal., has been authorized to construct an over-grade crossing of the track of the Atchison, Topeka & Santa Fé Railway in the city of San Diego and to construct track across Witherby Street conditional upon construction of new highway.

Power Houses, Shops and Buildings

Los Angeles Railway will build the sixth automatic substation of its system at Sixth Street and Central Avenue, on the edge of the downtown business district, within a few weeks. A 1,000-kw. rotary converter, made by the General Electric Company, will be installed. The fifth automatic substation was put in service at Fifty-fourth Street and Second Avenue Feb. 1. This station has a 1,000-kw. rotary converter of General Electric type. During the year the capacity of one of the ten manually operated substations will be increased by the installation of a new converter.

Wheeling Traction Company, Wheeling, W. Va., has given a contract to the R. R. Kitchen Company for the construction of a new operating carhouse at Norwood.

Trade Notes

Kent Engineering Company, district representatives of the Conveyors Corporation of America, Chicago, has changed its address from 504 First National Bank Building to 1110 Farnam Street, Omaha. This engineering firm handles the sale of American steam jet ash conveyors and American air-tight doors, as well as other power plant equipment in Nebraska and western Iowa.

Crescent Belt Fastener Company, New York, N. Y., has issued a new, concisely arranged service chart covering belt joining. This chart is in card form and covers completely and specifically the means and methods to insure best results under all conditions of work. This service chart, known as Form N. Y. 298, will be sent on request to the company at 247 Park Avenue, New York.

J. B. Engineering Sales Company, Connecticut sales representative of the Conveyors Corporation of America, Chicago, has moved its office from Hartford to Chamber of Commerce Building, New Haven. This firm handles the sales of American steam jet ash conveyors and other power plant and engineering specialties.

General Electric Company, Schenectady, N. Y., has recently given new geographic designations to its district office sales territories. The new designations more accurately describe the geographic territory covered by the districts in question. The old Atlanta district is now known as the Southeastern district, Boston district as New England district, etc.

Woeber Car & Manufacturing Company, Denver, Col., suffered by fire Feb. 7 damages amounting to about $12,000. The loss is covered by insurance. The Woeber concern was the maker of most of the tramway cars traversing the streets of Denver, but of late years the Denver Tramway, having decided to make its own cars, the Woeber concern has turned its attention largely to the making of automobile bodies.

Charles N. Pittenger, former superintendent of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, is now connected with the G. C. Kuhlman Car Company, Cleveland. Mr. Pittenger went to Pittsburgh about two months ago, but shortly afterward became identified with the Kuhlman concern, a subsidiary of the J. G. Brill Company of Philadelphia. He has supervision over wiring and equipping of all cars constructed in the Cleveland plant.

Heine Boiler Company, St. Louis, Mo., announces that the Tennant Company, with offices in the Union National Bank Building, Houston, will represent it in a new territorial division comprising the entire southern half of Texas. J. A. Tennant is in charge of this office. Messrs. Smith and Whitney of Dallas will continue as the Heine Boiler Company representatives in the northern half of Texas.

New Advertising Literature

Herbert Morris, Inc., Buffalo, N. Y., has issued book 5060, entitled "Thrift in Lifting." The booklet contains some thirty pages, illustrated, describing unusual features found in Morris cranes, information on platform hoists and slings of various types, triple-gear chain-blocks and overhead monorail tracks. The book was planned to give the information in the most concise form possible on material handling machinery.